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REVIEW ARTICLE

## The World Federation of Societies of Biological Psychiatry (WFSBP) guidelines for the treatment of adolescent sexual offenders with paraphilic disorders

Florence Thibaut<sup>1</sup>, John M. W. Bradford<sup>2</sup>, Peer Briken<sup>3</sup>, Flora De La Barra<sup>4</sup>, Frank Häbeler<sup>5</sup>, and Paul Cosyns<sup>6</sup>; on behalf of the WFSBP Task Force on Sexual Disorders\*

<sup>1</sup>University Hospital Cochin, Faculty of Medicine Paris Descartes, INSERM U 894 CPN, Paris, France, <sup>2</sup>University of Ottawa, Institute of Mental Health Research, Division of Forensic Psychiatry, Queen's University, Clinical Director, Forensic Treatment Unit, Brockville Mental Health Centre, Royal Ottawa Health Care Group, Brockville, Ontario, Canada, <sup>3</sup>Institute for Sex Research and Forensic Psychiatry, Center for Psychosocial Medicine, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, <sup>4</sup>East Psychiatry and Mental Health Department, University of Chile, Clinica Las Condes, Chile, <sup>5</sup>Clinic for Child and Adolescent Psychiatry, University of Medicine of Rostock, Rostock, Germany, and <sup>6</sup>University Forensic Centre (University Hospital of Antwerp), Belgium

### ABSTRACT

The primary aim of these guidelines was to evaluate the role of pharmacological agents in the treatment of adolescents with paraphilic disorders who are also sexual offenders or at-risk of sexual offending. Psychotherapeutic and psychosocial treatments were also reviewed. Adolescents with paraphilic disorders specifically present a different therapeutic challenge as compared to adults. In part, the challenge relates to adolescents being in various stages of puberty and development, which may limit the use of certain pharmacological agents due to their potential side effects. In addition, most of the published treatment programmes have used cognitive behavioural interventions, family therapies and psychoeducational interventions. Psychological treatment is predicated in adolescents on the notion that sexually deviant behaviour can be controlled by the offender, and that more adaptive behaviours can be learned.

The main purposes of these guidelines are to improve the quality of care and to aid physicians in their clinical decisions. These guidelines brought together different expert views and involved an extensive literature research. Each treatment recommendation was evaluated and discussed with respect to the strength of evidence for efficacy, safety, tolerability and feasibility. An algorithm is proposed for the treatment of paraphilic disorders in adolescent sexual offenders or those who are at risk.

### ARTICLE HISTORY

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### Introduction



Preliminary note: Most (if not all) of the literature on this subject concerns adolescents who committed sexual offences according to the laws of their country. They are deviant according to legal/societal norms of their country. The use of the term “deviant” does not imply a moral statement from the authors of this text.

“Juvenile sexual offenders” or “juvenile sex offenders” were defined as youths between the ages of 12 and 18 who have either been officially charged with a sexual crime (e.g., child molestation, rape, exhibitionism, voyeurism), have performed an act that could be officially charged, or committed sexually abusive/aggressive behaviour or any sexual act with a person of any age against the victim's will or in an aggressive, exploitative or threatening manner; the term “child molester” refers

to those who choose only or primarily child victims younger than the offender (Gerardin and Thibaut 2004; Miner et al. 2006). Most of the sexual offenders are males (Langström et al. 2015) and this paper will focus on them.

Deviant sexual behaviour often starts with the development of deviant sexual fantasies associated with masturbation. Studies of the natural history of the paraphilic disorders show that deviant sexual behaviour often begins in later adolescence or early adulthood. Abel et al. (1985) showed that 42% of males with a paraphilic disorder exhibited deviant sexual arousal by age 15 and 57% by age 19; in the case of paedophilia against same-sex children (homosexual paedophilia) this appeared to show also an earlier onset with 53% reporting deviant arousal by age 15 and 74% by age

\*Chair: Florence Thibaut (France). Co-Chairs: John W. Bradford (Canada), Paul Cosyns (Belgium). Secretary: Peer Briken (Germany). Members: Flora de la Barra (Chile), Yesim Taneli (Turkey), Harvey Gordon (UK), Ariel Rosler (Israel), Elie Witztum (Israel).

CONTACT Professor Florence Thibaut  [florence.thibaut@aphp.fr](mailto:florence.thibaut@aphp.fr)  University Hospital Cochin (site Tarnier), Department of Psychiatry and Addictive disorders, 89 rue d'Assas, 75006 Paris, France.

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18. In some offenders, the severity of the deviant sexual behaviour increases with age, from exhibitionism, voyeurism or fetishism, to rape or child sexual abuse (Longo and McFadin 1981). This raises questions about how to identify deviant sexual interest occurring in adolescence, prior to sexual acting out, and to implement a prevention strategy. In theory, if successful evidence-based treatment intervention, either psychological or pharmacological, occurred during adolescence with identified adolescent sexual offenders and adolescents suffering from paraphilic disorders, this could have an important impact on adult deviant sexual behaviour and, in the case of paedophilia, on the incidence of the sexual abuse of children (Bradford and Fedoroff 2006).

However, the treatment of adolescents with pharmacological agents requires special considerations compared to adults.

### Paraphilic disorders: definitions

The terms “sex offenders” or “sexual offenders” and “paraphilic disorders” will be used in the following text. In order to clarify the respective use of these words, it is important to remember that, not all sexual offenders suffer from a paraphilic disorder, but only part of them, and that, not all patients with a paraphilic disorder are sexual offenders (in some cases, they only suffer from deviant sexual fantasies or urges, or their deviant sexual behaviour does not involve a non-consenting person or a child).

Paraphilic disorders (from the Greek “para” meaning around or beside and “philos” meaning love) are sexual stimuli or acts that are deviations from socially accepted sexual behaviour, but are necessary, and in some cases sufficient, for some persons, to experience sexual arousal and orgasm (Garcia and Thibaut 2011; Thibaut 2013a). Paraphilic disorders are distributed from a spectrum of nearly normal behaviour to being hurtful or destructive of oneself or others. In the Diagnostic and Statistical Manual Disorder, Fourth Edition, Text Revision (DSM-IV-TR, American Psychiatric Association 2000) or the International Classification of Mental Diseases (ICD-10th, World Health Organisation 1992), paraphilias were classified in the “Sexual and Gender Identity Disorders” chapter and were characterised by “recurrent, intense, sexually arousing fantasies, sexual urges or behaviours, generally involving (1) non-human objects, (2) the suffering or humiliation of oneself or one’s partner, or (3) children or other non-consenting persons that occur over a period of 6 months” (criterion A), which “cause clinically significant distress or impairment in social, occupational, or other important areas of functioning” (criterion B). In the case of paedophilia, the sexual activity

involves prepubescent children, generally aged 13 years or younger. In general, paedophiles must be at least 16 years old and must be at least 5 years older than the victim. For juvenile or younger paedophiles, no age is specified and clinical judgment must be used (i.e., sexual maturity of the child and age difference between the victim and the perpetrator). Along with a residual category called “paraphilia not otherwise specified”, DSM IV-TR described eight specific disorders of this type: exhibitionism, fetishism, frotteurism, paedophilia, sexual masochism, sexual sadism, voyeurism and transvestic fetishism.

In the DSM-5 (American Psychiatric Association 2013), these criteria should be addressed in the presence of three main aspects: first, the sexual arousal by deviant sexual stimuli, second, the negative consequences for the individual or the society and, finally, the fact that the person acts on his or her urges or that the urges or fantasies cause significant distress, interpersonal difficulty or impairment in functioning. The most important change in DSM-5 is the distinction between paraphilias and paraphilic disorders: “a paraphilia by itself would not automatically justify or require psychiatric intervention. A paraphilic disorder is a paraphilia that causes distress or impairment to the individual or harm to others”. In this concept, having paraphilia would be a necessary but not a sufficient condition to determine a paraphilic disorder.

Paraphilic disorders are not illegal; however, acting in response to paraphilic urges may be illegal (sex offence) and, in some cases, it could result in severe legal sanctions as is frequently observed in the case of paedophilia. Patients with paraphilic disorders usually come to medical or legal attention by committing an act against a child or a non-consenting adult because most of them, especially adolescents, do not find their sexual fantasies distressing or ego-dystonic enough to voluntarily seek treatment or they may feel ashamed and do not dare to ask for medical advice prior to sexual acting out.

For some individuals, paraphilic fantasies or stimuli are obligatory for erotic arousal and are always included in their sexual activity (exclusive paraphilic disorders). In other cases, the paraphilic preferences occur only episodically, whereas at other times, the person is able to function sexually without deviant stimuli or fantasies.

### Paraphilic disorders: characteristics

Paraphilic disorder is mainly a male disorder (90–99% of cases, except for masochism where the prevalence of females may be higher) (Langström et al. 2015).

In a sample of 1,600 child and adolescent sexual offenders (mean age 14 years (range 5–19)), Ryan (1991) reported that denial was frequently observed.

As observed in adults, comorbidities are frequently reported (mostly substance abuse, affective disorders, cognitive difficulties with poor academic performances and learning problems, and antisocial behaviour) (Malin et al. 2014). Galli et al. (1999) reported in a sample of 22 paraphilic adolescents: 94% conduct disorders, 71% attention deficit and hyperactivity disorder (ADHD), 23% major depressive disorder, 27% bipolar disorder, 72% substance abuse. In their sample, 95% of the subjects met DSM III-R criteria for two or more paraphilias. Impulse-control disorders, posttraumatic stress disorders or conduct disorders were also described in association with paraphilic disorders (Dolan et al. 1996; Raymond et al. 2003). Personality disorders were frequently observed in paraphilic subjects (33–52%) (borderline or antisocial personality disorders in most cases) (Shaw et al. 1996).

The most common characteristic observed in juvenile sexual offenders was a history of victimisation. Past histories of sexual (50%) or physical abuse (66 vs. 20% in non-sexual offenders) were reported in these subjects (Longo 1982; Finkelhor and Araj 1986; Kavousi et al. 1988; Jespersen et al. 2009). DeLisi et al. (2014) also found a 6-fold increase of likelihood of sexual offending, based on data from 2,520 incarcerated male juvenile offenders, in youths with childhood sexual abuse histories. Becker et al. (1988) have suggested a probable basis for the development of a deviant sexual arousal pattern in these children. They make the assumption that deviant sexual arousal and behaviour are learned in individuals through modelling and conditioning experiences.

Family relationships were also frequently described as dysfunctional with parents having substance abuse problems, criminal and impulsive behaviours or psychiatric disturbances (Knight and Prentky 1993; Worling, 1995).

In addition, early exposure to sex or pornography and to sexual violence might play a role in further sex offending (Seto and Lalumière 2010). Moreover, frequency of pornography use adds significantly to the prediction of sexual recidivism, which was assessed up to 15 years after release in sexual offenders (Kingston et al. 2008).

Driemeyer et al. (2013) stated that adolescent sex offenders ( $n=32$ ) were less experienced sexually, had less confidence in their interpersonal skills, and reported more sexual deviance than alleged violent offenders ( $n=32$ ).

Compared with peer sexual abusers, child sexual abusers have a less delinquent predisposition, less substance-abuse proneness and less antisocial functioning (Glowacz and Born 2013). In the same way, female adolescent sexual offenders who have committed a sexual offence against a younger child (25 cases) have considerably fewer problems in the domains of school, family and friends as compared to those who have committed sexual offences with a peer victim (15 cases) or a misdemeanour sexual offence (31 cases) (Van der Put 2013). Female offenders have also a more severe history of victimisation (Mathews et al. 1997; Lamy et al. 2015).

Adolescents who sexually abused a sibling, versus a non-sibling, were more likely to have histories of sexual abuse and been exposed to domestic violence and pornography ( $n=100$  cases vs.  $n=66$ ) (Latzman et al. 2011).

In summary, adolescent sexual offenders form a heterogeneous group including individuals with anti-social personality disorders, adolescents with problematic family background and adolescents with atypical sexual interests, where different risk factors are predictive of recidivism. In the same way, among juvenile offenders, Pullman and Seto (2012) have identified a subgroup of sexual offenders with unique risk and aetiological factors including childhood sexual abuse and atypical sexual interests.

Adolescents who commit child sexual homicides (less than 1% of the total murders committed by juveniles in the USA) often experienced violent sexual fantasies before their crimes (Ryan, 1991).

Patients with mental retardation have a similar or even slightly increased proportion of sexual problems as compared to subjects of average intelligence, but the types of problems are different. They more often show inappropriate, non-assaultive sexual behaviour, such as public masturbation and exhibitionism, and they are less discriminating in their choice of victim (Hayes 1991).

Finally, juvenile sex offending has also been found to occur in pre-adolescent and younger children. Araj (1997) reported sexual aggression in children with a mean age of onset between 6 and 9 years. Their victims are mostly siblings or friends. Most of these offenders have been physically or sexually abused, have frequent learning difficulties, impaired relationships, and dysfunctional families (with inter-parental violence). Yet, longitudinal studies are lacking and it is not known which children will persist in their sexual behaviour problems in adolescence and adulthood (Gerardin and Thibaut 2004).

Budd et al. (2015) studied patterns of co-offending by female sexual offenders (FSOs), using 21 years

(1992–2012) of the US National Incident-Based Reporting System data to analyse incidents of sexual offending committed by four female groupings: solo FSOs ( $n=29,238$ ), co-ed pairs consisting of one male and one FSO ( $n=11,112$ ), all-female groups ( $n=2669$ ), and multiple perpetrator groups that consisted of a combination of three or more FSOs and male sexual offenders ( $n=4268$ ). Using a multinomial logistic regression model, the data showed significant differences in offender, victim, and crime context incident characteristics. The data also indicated that incidents with solo FSOs and all-female groups have similar characteristics, co-ed pairs and multiple perpetrator incidents have similar characteristics, and these two categorizations are fairly distinct from one another.

### **Epidemiology of sexual offending and risk factors for recidivism**

Of all arrests for sexual crimes in the USA in 2011, juvenile arrests represented 14% of forcible rapes (Snyder and Mulako-Wantota 2013). A 14% rate of bestiality was reported among juvenile sexual offenders (Seto and Lalumière 2010: meta-analysis).

In parallel, the number of juvenile sexual offender programmes has been rising, especially in the USA.

Recidivism is a major concern in sexual offenders. Most people recognise that incarceration alone will not solve sexual violence. Sexual recidivism rates have been found to be lower than for adults ranging from 7% (Caldwell, 2010) to 30% (Langström 2002). According to Caldwell (2002), it rarely exceeds 15% as compared to non-sexual recidivism, which ranges from 37 to 89% depending on the lengths of follow-up and the characteristics of the sample. In a meta-analysis, Reitzel and Carbonell (2006) have reported, in juvenile sexual offenders, an average recidivism rate (based on an average 59-month follow-up period across studies) of 12.5% for sexual crimes as compared to about 25% for non-sexual crimes (2986 subjects). In comparison, in adults (61 follow-up studies) Hanson and Bussière (1998) reported a sexual offence recidivism rate of 13.4% (23,393 cases). In adults, sexual offence recidivism was best predicted by the type of sexual deviancy, and to a lesser extent, by general criminological factors (age, total prior offences) and failure to complete treatment. Alexander (1999) conducted a review on 79 sexual offender treatment outcome studies published between 1943 and 1996 including 10,988 subjects (7% were juvenile sexual offenders); analyses based on location of treatment resulted in close recidivism rates whatever the location (6.3–8.5%) (outpatient setting, prison, hospital

or unspecified) (based on re-arrests). The rates of recidivism were respectively 5.8% for rapists and 2.1% for child molesters.

It seems that treating the offenders, at least in adults, is critical in preventing sexual violence and reducing victimisation (Gerardin and Thibaut 2004; Walker et al. 2004; Fortune and Lambie 2006; Thibaut 2003; Thibaut et al. 2010; Dennis et al. 2012: Cochrane Database Systematic Review; Långström et al. 2013; Kahn et al. 2015: Cochrane Database Systematic Review). In the same way, Reitzel and Carbonell (2006) in a meta-analysis, have reported that, in juvenile sexual offenders, the sexual recidivism rate was 7.4% for those who received treatment (any kind) ( $n=1655$ ), as compared with 19% in the control groups ( $n=1331$ ). The average follow-up period was 59 months. It has also been shown that longer follow-up periods resulted in higher recidivism rates for adolescents who offend sexually (for review, see Worling et al. 2010).

Apart from failure to complete the treatment programme, research and meta-analyses suggest that sexual deviance and antisocial behaviour are both related to sexual recidivism in adolescents (Worling and Curwen 2000; Hanson and Morton-Bourgon 2005).

Poor social skills were directly related to recidivism, whereas cognitive distortions and deviant sexual fantasies mediated the role of learning problems and deviant sexual experiences (Kenny et al. 2001). Rasmussen (1999) examined the criminal history records of 170 youths who were convicted as juvenile sexual offenders. Factors associated with recidivism included a prior history of criminal behaviour, multiple victims, and failure to complete sexual offender treatment. A meta-analysis of 59 independent studies comparing male adolescent sexual offenders ( $n=3855$ ) with non-sexual offenders ( $n=13,393$ ) on variables reflecting general delinquency risk factors (antisocial tendencies), childhood abuse, exposure to violence, family and interpersonal problems, sexuality, psychopathology, and cognitive abilities was conducted by Seto and Lalumière (2010). The results showed that adolescent sexual offending cannot be considered as a simple manifestation of general antisocial tendencies. Adolescent sexual offenders had much less extensive criminal histories, fewer antisocial peers, and fewer substance use problems compared with non-sexual offenders. Special explanations suggesting a role for sexual abuse history, early exposure to sex or pornography, exposure to sexual violence, other abuse or neglect, social isolation, atypical sexual interests, anxiety, and low self-esteem received support. Explanations focusing on attitudes and beliefs about women or sexual offending, family communication problems or poor parent–child attachment, exposure



to nonsexual violence, social incompetence, conventional sexual experience, and low intelligence were not supported. Ranked by effect size, the largest group difference was obtained for atypical sexual interests, followed by sexual abuse history, and, in turn, criminal history, antisocial associations, and substance abuse. In the same way, Christiansen and Vincent (2013) using a dataset from the national juvenile court data archive, reported that the strongest individual predictors of sexual recidivism in adjudicated juvenile sex offenders were: prior sexual and non-sexual offending, hands-off offending, offending against a child, younger school grade/age at time of initial offence, minority status (Asian or Hispanic ethnicity) and not attending school. Subsequently, Aebi et al. (2015) tested the link between past sexual abuse, either with or without contact, and sexually offending behaviour in a nationally representative sample of male and female adolescents attending 9th grade public schools in Switzerland while controlling for other types of abuse, mental health problems, substance use, and non-sexual violent behaviours. Self-reported data were collected from 6628 students (3434 males, 3194 females, mean age = 15.50 years, SD = 0.66 years). Exposure to contact and non-contact types of sexual abuse was assessed using the Child Sexual Abuse Questionnaire and sexually offending behaviour by the presence of any behaviour indicating sexual coercion. Two hundred and forty-five males (7.1%) and 40 females (1.2%) reported having sexually coerced another person. A strong relationship between past sexual abuse, with and without physical contact, and sexual-offending behaviour in male and female adolescents was shown and reducing exposure to non-contact sexual abuse (like Internet-based sexual exploitation) was also suggested to prevent sexual violence in youths.

## Risk assessment

Risk assessment is a key element in the prevention of recidivism among juvenile sexual offenders. It is generally held that when assessing risk of sexual reoffending, actuarial assessments are superior to unstructured clinical judgment (Worling 2004; Hanson and Morton-Bourgon 2009). Some risk assessment tools have been developed for adolescent sexual offenders. Hempel et al. (2013) have reviewed the current literature (19 studies) on the predictive accuracy of six risk assessment instruments: the Juvenile Sex Offender Assessment Protocol II (J-SOAP-II) (static risk scale) (Prentky and Righthand 2003; Fanniff and Letourneau 2012), the Juvenile Sexual Offence Recidivism Risk Assessment Tool II (J-SORRAT-II; Epperson et al. 2006), the Estimate of Risk of Adolescent Sexual Offence Recidivism

(ERASOR; Worling and Curwen 2001; Worling 2004), the Juvenile Risk Assessment Scale (JRAS; Hiscox et al. 2007), the Structured Assessment of Violent Risk in Youth (SAVRY; Borum et al. 2003), and, finally, the Hare Psychopathy Checklist: Youth Version (PCL: YV; Forth et al. 2003). Specialised tools such as the ERASOR or the J-SOAP-II appeared better in terms of accuracy for prediction of sexual recidivism. This was further confirmed by Worling and Langton (2015), in a cohort of 81 adolescent male sexual offenders.

In North America, three structured risk assessment instruments are now in common use for adolescent males: ERASOR, J-SOAP-II, and more recently J-SORRAT-II. In the US, use of one or more of these instruments (mostly ERASOR and J-SOAP-II) has increased significantly from about two-fifths of the programmes in 2002 to over three-quarters of the programmes in 2009 as compared to two-thirds of the programmes in Canada in 2009 (McGrath et al. 2009).

In the studies by Klein et al. (2012, 2015), using the SAVRY and the Structured Assessment of Protective Factors for violence risk (SAPROF), risk factors and protective factors were significantly and negatively correlated. Protective factors failed to achieve a significant incremental predictive accuracy beyond that captured by the SAVRY risk factors alone.

Nevertheless, these assessment tools should only be used as one component of a comprehensive assessment protocol (Adolescents who have engaged in sexually abusive behaviour: effective policies and practices adopted by the Association for the Treatment of Sexual Abusers, Executive Board of Directors on October 30, 2012) (<http://www.atsa.com/pdfs/Policy/AdolescentsEngagedSexuallyAbusiveBehavior.pdf>).

## Outcome measures

Studies examining the efficacy of treatment programmes implemented in populations of adolescent sexual offenders have used different outcome measures. In most cases, they have used self-report questionnaires. Some studies have defined recidivism as the re-arrest and/or re-conviction of a juvenile after the completion of treatment. However, acts of sexual aggression are often underreported and re-arrest or re-conviction rates may not accurately reflect rates of recidivism, especially when the duration of follow-up is too short.

The penile plethysmograph measures penile tumescence, typically with a strain gage, when the subject attends to slides, audio- or videotapes depicting various appropriate and deviant sexual stimuli. The magnitude of the individual's erection response to a

category of stimuli is considered an indication of his sexual interest in that behaviour or in persons of that age and gender (Murphy and Barbaree 1994; Marshall and Fernandez 2003). According to McGrath et al. (2009), this method is used in less than 10% of adolescents in North America. Sexual arousal testing using a phallometric technique has come into some criticism as being too intrusive in adolescence; however, this argument needs to be considered against the possible consequences of not overseeing a possibly dangerous paraphilic interest (Bradford and Fedoroff 2006). Clift et al. (2009) have reported that post-treatment inability to suppress deviant sexual arousal to male and female children was significantly related to sexual offence recidivism over the 6-year follow-up period of the study ( $n=132$  male adolescents). However, the ethical question of further exposing minors to sexually explicit materials (deviant or not deviant) complicates this issue (Weinrott 1996). Mental health professionals, however, should be aware that, in some countries, possession of audio-visual sexual material (especially including children) even for diagnostic or therapy purposes may be against the law (American Psychiatric Association 2013) and that presenting such material to adolescents may, in legal terms, count as "sexual abuse of minors".

Viewing time measures compute the length of time an individual views slides of males and females of different ages as well as information from a standardised questionnaire. Individuals in the slides are clothed. Among community and residential programmes for male adolescents developed in North America, about one-third used viewing time measures (McGrath et al. 2009). Visual Reaction Time has been shown to discriminate between individuals of different sexual interests. Visual reaction time measures are sensitive to age preferences (Abel et al. 1998, 2004; Letourneau 2002; Gress 2005; Banse et al. 2010). Visual reaction time evaluation of sexual interest is less intrusive and may offer an objective measure of deviant sexual interests in adolescence but also possibly a large-scale screening tool (Bradford 2006). However, Crooks et al. (2009) have questioned the use of rapid serial visual presentation of child or animal images in adolescent sexual offenders: adolescent cognitive abilities may not be able to allow them to concentrate on the task and deviant sexual interest may be present to different degrees in adolescents. In fact, its use as an outcome measure with adolescents is a subject of controversy among professionals as no normative data exist for adolescents.

## Treatment goals

Initially, interventions for juvenile sexual offenders were largely based on adult sexual offender interventions, with little consideration of developmental aspects that are specific to adolescence. Recently interventions that address youth-specific factors associated with sexual behaviour problems and include an important family focus have been reported (for review of the past history of these interventions: Dwyer and Letourneau 2011).

In addition, traditional treatment approaches failed to prioritise issues involving cultural competence. Venable and Guada (2014) have pointed out the importance of developing this aspect.

Reducing sexual acting-out risk and improving psychosocial functioning are the ultimate aims of any treatment programme for sexual offenders. In addition to psychological and behavioural therapies, always used as first-line treatment approaches, several pharmacological treatment options are available in the most severe cases. The treatment choice will essentially depend on the following parameters:

- patient's previous medical and psychiatric history,
- patient's observance,
- intensity of deviant sexual fantasies and sexual preoccupations,
- comorbid hypersexuality (see Garcia and Thibaut 2010),
- risk of sexual violence, and
- completion of growth and puberty.

Psychological treatment is predicated in adolescents on the notion that sexually deviant behaviour can be reduced and controlled by the offender and that more adaptive behaviours can be learned (Weinrott 1996). Treatment goals with cognitive behavioural therapies in adolescent sexual offenders include: helping offenders to reduce deviant sexual arousal, challenging cognitive distortions and rationalizations that support or trigger offending behaviour, accepting responsibility for sexual behaviour, improving victim empathy and social skills, improving family relationships and reducing personal trauma if any. The number and type of treatment programmes have largely increased but studies, which evaluate their efficacy, using a controlled design, remain scarce.

Although the full discussion of the hormonal changes at puberty and the various stages of pubertal development is beyond the scope of this particular paper, it is clear that the development of secondary sex characteristics occurs during puberty and that many of these changes are completed by age 15 in males. These changes are dependent on hormonal levels. Puberty would be regarded as being delayed in onset if it has not

occurred on average by age 15. There is also a growth spurt that occurs within an onset of anywhere between 10.5 and 16 years of age, with considerable variability (Bradford and Fedoroff 2006). This means that these factors have to be taken into account with any pharmacological intervention in adolescence. Most specifically if that pharmacological intervention affects hormone levels such as the use of antiandrogens in adolescence then this clearly has to be very carefully and very specifically evaluated before such intervention occurs.

There is good evidence that selective serotonin reuptake inhibitors (SSRIs), affecting the neurotransmitter serotonin (5 hydroxytryptamine), can be an effective treatment of sexually deviant behaviour without an effect on hormonal levels (Thibaut et al. 2010). This class of pharmacological agents has already been used in treating a number of adolescent conditions including obsessive-compulsive disorders as well as depressive disorders (Bradford 2001; Hollander et al. 1996). Nonetheless, the US Food and Drug Administration (FDA) released safety warnings stating that use of antidepressants may increase the risk of suicidality in children, adolescents and young adults up to age 24 years (<http://www.fda.gov/Drugs/DrugSafety/InformationbyDrugClass/UCM096273>).

## Methods of our analysis

These guidelines are intended for use in clinical practice by clinicians who diagnose and treat adolescents with paraphilic disorders. The aim of these guidelines is to improve the quality of care and to aid physicians in clinical decisions. Although these guidelines are based on the available published evidence, the treating clinician is ultimately responsible for the assessment and the choice of treatment options, based on knowledge of the individual subject. To achieve our aim, an extensive literature search was conducted by J.M.W. Bradford and F. Thibaut, using the English-language literature indexed on MEDLINE/PubMed (1990–2014 with the following keywords “adolescent sexual offenders, juvenile sexual or sex offenders, paraphilia, paraphilic disorder, treatment” supplemented by other sources, including published reviews (according to previous WFSBP guidelines, Soyka et al. 2008). Both controlled and uncontrolled studies were included in the review. Studies of any form of treatment were eligible for inclusion. The treatments included in the review were multisystemic therapy, cognitive-behavioural therapy, satiation therapy, vicarious sensitisation, family therapy, psychoeducational therapy, and pharmacological treatments. Most of the studies included male adolescent sexual offenders. The outcomes eligible for inclusion were recidivism,

self-reported measures of deviant sexual attitudes and behaviours, and measures of arousal in relation to deviant sexual stimuli. The evidence from the literature research was summarised. Each treatment recommendation was evaluated and discussed with respect to the strength of evidence for its efficacy, safety, tolerability and feasibility. It must be kept in mind that the strength of recommendation is due to the level of efficacy and not necessarily of its importance. Four categories were used to determine the hierarchy of recommendations (related to the described level of evidence) (Soyka et al. 2008):

*Level A:* there is good research-based evidence to support this recommendation. The evidence was obtained from at least three moderately large (sample size equal to or greater than 50 participants), positive, randomised, controlled, double-blind trials (RCTs).

*Level B:* there is fair research-based evidence to support this recommendation. The evidence was obtained from at least two moderately large, positive, randomised, double-blind trials or from one moderately large, positive, randomised, double-blind study and at least one prospective, moderately large (sample size equal to or greater than 50 participants), open-label, naturalistic study.

*Level C:* there is minimal research-based evidence to support this recommendation. The evidence was obtained from at least one randomised, double-blind study with a comparator treatment and one prospective, open-label study/case series (with a sample of at least 10 participants), or at least two prospective, open-label studies/case series (with a sample of at least 10 participants) showing efficacy.

*Level D:* evidence was obtained from expert opinions (from authors and members of the WFSBP Task Force) supported by at least one prospective, open-label study/case series (with a sample of at least 10 participants).

*No level of evidence or Good Clinical Practice (GCP):* This category includes expert opinion-based statements for general treatment procedures and principles.

The guidelines were developed by the authors and arrived at by consensus with the WFSBP Task Force, consisting of international experts in the field.

## Limitations of our analysis

Most reports on the treatments of paraphilic disorders in sexual offender adolescents are open studies. In general, treatment efficacy studies are being extremely difficult to conduct and are marked by some methodological biases for several reasons: small sample sizes leading to false-negative results; sexual offending is not socially acceptable and those who suffer from this behaviour



rarely seek treatment voluntarily; ethical considerations make it difficult performing double-blind placebo-controlled studies (or no treatment studies) in potential offenders (for review Marshall and Marshall 2007), the outcome measurements are usually based on subjective measures such as self-report questionnaires of conventional and paraphilic sexual activity.

Comparisons between studies are often difficult due to methodological differences: retrospective or prospective designs, heterogeneity of patients included (types of paraphilic disorders, comorbidities, types of victims, number of previous offences and/or previous convictions, etc.), durations of follow-up, outcome variables such as definitions of recidivism, types of treatment and compliance, statistical analyses, etc. (Thibaut et al. 2010).

In addition, specific problems occur when randomisation is adapted to psychological treatments (Guay 2009). In fact, the therapist can have a significant impact on therapeutic outcomes if, he (or she), can adapt treatment to the learning style and interpersonal approach of each subject and adjust therapy to the fluctuations in the subject's motivation and mood. Controlled study design does not allow many of the features of an effective therapist–subject relationship.

## Results

A search of the literature for adolescents with paraphilic disorders came to the conclusion that it is almost nonexistent and the majority of the literature relates to adolescent sexual offenders. As the studies in the bibliography included adolescent sexual offenders, this paper will refer to adolescent sexual offenders with the assumption that a substantial proportion of them would have some type of paraphilias or paraphilic disorders, which is not always specified.

Effective treatments for adults who have paraphilic disorders, some of whom are sexual offenders, have clearly shown to be available in recent meta-analyses of psychological treatments and extensive reviews of pharmacological treatments (Hanson et al. 2002; Losel and Schmucker 2005; Schmucker and Lösel 2008; Thibaut et al. 2010: WFSBP Guidelines on Pharmacological Treatment of Paraphilias; Garcia and Thibaut 2011; Dennis et al. 2012: Cochrane Rev. 2012 on psychological interventions; Bradford et al. 2013; Långström et al. 2013; Garcia et al. 2013; Assumpção et al. 2014; Khan et al. 2015: Cochrane Rev. 2015 on pharmacological interventions).

It is also quite clear that most of the research on adolescent sexual offenders has focused almost exclusively on males. This is understandable as Reitzel and

Carbonell (2006) reported, in a meta-analysis of nine published and non-published studies on the effectiveness of treatment of juvenile sexual offenders, that most of them were males ( $n=2986$  with 2604 male juvenile offenders). The study of adolescent sexual offenders has lagged behind but, more recently, research studies on adolescent sexual offenders have been increasing (Seto and Lalumière 2010). In studies of adult sexual offenders there are reports that their first sexual offence occurred while they were teenagers. There are also direct reports of sexual offending behaviour occurring in adolescence (Abel et al. 1993) and even in childhood (Araji 1997; Burton 2000).

Finally, most of the studies conducted in adolescent sexual offenders involved psychological treatment, especially cognitive behavioural therapies.

## Psychological treatments

Various types of psychological treatments have been reported including cognitive behavioural treatment (CBT) as the most common form of treatment followed by psychosocial education, family system treatment, multimodal treatment and multisystemic therapy.

In fact, the approaches that have been commonly used in adolescent sexual offenders, in community or residential programmes in North America (USA and Canada) were CBT in 90% of the programmes, when psycho-socio-educational and multisystemic approaches were cited in respectively 35 and 22% of the programmes (according to a survey conducted by McGrath et al. 2009).

In children, as well as in female adolescents, working on sexual abuse history was also an important component of treatments.

It is noteworthy that despite the recognition of the importance of treatment engagement, therapeutic alliance and motivation (Marshall et al. 1999; Mann 2000), less than half the community programmes in North America reported using motivational interviewing.

## Description of the various psychological treatment approaches

- Classical insight-oriented approaches for the treatment of adolescent sexual offenders are of limited value (The National Task Force on Juvenile Sexual Offending, 1988, USA, <https://www.ncjrs.gov/App/Publications/abstract.aspx?ID=110827>).
- Standard CBT, usually considered as treatment as usual for juvenile sexual offenders includes: decreasing deviant arousal, increasing victim empathy, addressing cognitive distortions especially atypical

sexual interests, relapse prevention and family counselling. Key treatment objectives include: youth acceptance of responsibility for the offence(s), breaking the sexual offence cycle by increasing youth's awareness of triggers, identification and exercise of internal and external behaviour controls and development of a relapse prevention protocol to reduce the risk of recidivism. To achieve these goals, several techniques are used: (1) covert sensitisation, described as follows: the sexual abuser imagines performing the chain of behaviours that led to his sexual offending or that might lead to some high-risk situation. Prior to committing an offence or engaging in high-risk behaviour in his imagination, the abuser interrupts the chain by imagining an aversive consequence or by imagining successfully escaping the situation (Maletzky 1991; McGrath 2001). This technique is currently being used in about 42% of cases in North America according to McGrath et al. (2009); (2) verbal satiation (a conditioning paradigm of extinction) is carried out in the same manner as masturbatory satiation (13% of cases) except that the client does not masturbate while verbalising his abusive sexual fantasies (Maletzky 1991; McGrath 2001). This approach is used in 11% of cases in North America (McGrath et al. 2009). Some studies have used laboratory satiation with plethysmography. Imaginal desensitisation using deviant sexual stimuli extinction controlled by relaxation was also reported.

- Multisystemic treatment (MST) directly addresses intrapersonal (e.g., cognitive problem solving), familial (e.g., inconsistent discipline, low monitoring, family conflict), and extra-familial (e.g., association with deviant peers, school difficulties) factors that are associated with youth serious antisocial behaviour, including sexual offending (Letourneau et al. 2009). Protocols also address youth and caregiver denial about the offence.
- Psycho-socio-educational approach emphasises education as a method of helping sexual abusers to change their behaviour. Group classes and social skills practice are typically included.

The results of the studies using these latter therapeutic approaches will be detailed in this paper.

### *Cognitive behavioural treatment (CBT) (Table I)*

- (1) Studies of CBT started in the late 1980s with Becker et al. (1988) reporting on the effectiveness of CBT for aggressive adolescent sexual offenders. A sample of male sexual offenders ( $n=24$ ) participated in a multicomponent community-based

outpatient treatment programme, which included various levels of CBT (Table I). This was a typical type of comprehensive CBT programme that was also used in adults at this time. In addition there was a detailed sexual behaviour evaluation including sexual preference testing by penile plethysmography. In this particular study, sexual arousal testing was completed at the entry point to the study and also post-treatment as an outcome measure. Results from this study showed a significant decrease in deviant sexual arousal from pre-treatment to post-treatment in offenders with a sexual preference for male victims. Adolescent sexual offenders with a sexual preference for female victims did not demonstrate any significant decrease in sexual arousal.

- (2) McConaghy et al. (1989) reported on a sample of six adolescent male offenders (three paedophiles) and 39 adult offenders who were randomly allocated to CBT in the form of covert sensitisation; medroxyprogesterone acetate (MPA) treatment; or imaginal desensitisation with or without the addition of MPA treatment. Results from this relatively small study indicated that the adolescents required additional treatment (either CBT or MPA) (4/6 adolescents as compared to 7/39 adults). These results suggested that adolescents might be more resistant to treatment, including MPA. Adolescents showed lower responses at first year (not significant) but the decrease became more important during the following years, 3/6 adolescents offended vs. 3/39 adults. It was suggested that their sexual drive/sexual urges were under more direct hormonal control than in adults, which may indicate more treatment resistance. However, it is important to notice that, in several cases, MPA treatment was used for a short duration (6 months) and was interrupted before recidivism occurred (for detailed information, see Table I).
- (3) Hunter and Santos (1990) completed a study of 27 male paedophile adolescent sexual offenders (with a high comorbidity of alcohol and drug abuse). They participated in a specialised residential treatment programme, which used specific CBTs including satiation and covert sensitisation, as well as individual, group and family insight-orientated psychotherapy (Table I). Outcome measures included deviant sexual arousal as measured by penile plethysmography. The results of the treatment programme indicated a significant decrease in deviant sexual arousal in the participants when pre-and post-treatment levels

Table I. Cognitive Behavioural Treatment (CBT).

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
Becker et al. (1988) USA Open study No comparison group	N=24 Males Outpatients Sex offenders: 22/24 (one case > 2 offences) Victims: majority <13 y (36/47) Type of paraphilia? Mean age: 15.6 y (range: 13–18) Previous history of sexual abuse? Comorbidities: 23/24 cases with no previous psychiatric hospitalization	<b>Structured CBT programme</b> (Abel et al. 1984): Multicomponent treatment programme with verbal satiation, cognitive restructuring, covert sensitisation, social skills, anger training control, sex education and relapse prevention sessions <i>Duration of follow-up?</i>	<i>Timepoints:</i> Before treatment 1 week after treatment completion <i>Outcome measures:</i> No scales Sexual activity and interests <b>Plethysmography:</b> (2 min audiotapes description of paedophilic behaviour and 2 min audiotapes description of conventional sexual behaviour between adults) Levels of aggression for the victim rated	<b>Plethysmography:</b> Mean erection response to verbal coercion cue, physical coercion cue, sadism cue and pure assault cue: <b>11 cases of deviant sexual behaviour with male victims:</b> Significant decrease in arousal post treatment: Pre-low aggression level, n=4 cases (mean levels of decrease: -39). Pre-high aggression level, n=7 cases (mean levels of decrease: -17) <b>13 cases of deviant sexual behaviour with female victims:</b> No significant decrease in arousal post treatment: Pre-low aggression level, n=1 case (mean levels of increase: +24). Pre-high aggression level n=12 cases (mean levels of decrease: -13.5)
Hunter and Santos (1990) USA Open study No comparison group	N=27 Males Type of paraphilia: 27 paedophiles Victims: Mean age of victims: 6 y. Use of force: 60% 12 male paedophilic sex offenders: mean number of offences: 20. Mean number of male victims: 4. Mean age: 15.75 y (range: 13–17) 15 female paedophilic sex offenders: mean number of offences: 31. Mean number of female victims: 4. Mean age: 15.87 y (13–17) Previous history of sexual abuse: 80% Comorbidities: drug or alcohol abuse: 53–58%	<b>CBT</b> (Becker et al 1988): Multicomponent treatment programme including: satiation therapy (extinction model) 4 sessions per week (1 h); laboratory satiation (1 h/week) (slides and plethysmography); covert sensitisation; social skills training; anger control and sex education <i>Plus</i> Inpatient residential programme Insight-oriented individual psychotherapy (2 sessions per week) Insight-oriented group psychotherapy (1 session per week) Family therapy (1–2 sessions per month) Therapeutic milieu Substance abuse counselling <i>Duration of follow-up?</i> <b>Satiation therapy adapted to adolescents:</b> Sexual thoughts and visual stimuli in conjunction with repetitive and prolonged exposure to deviant and non deviant stimuli (conditioning paradigm of extinction) 4 sessions (1 h)/week <i>Plus</i>	<i>Timepoints:</i> Twice before treatment Monthly <i>Outcome measure:</i> <b>Plethysmography:</b> Audiotape stimuli (conventional and deviant sexual behaviour)	<b>Plethysmography:</b> Significant differences in terms of arousal (plethysmography): <b>Female paedophiles (15):</b> Non deviant/deviant arousal: 12% at baseline and 44% after 2-month treatment Arousal for non aggressive and aggressive sexual activity with a child decreased by respectively 32 and 35% <b>Male paedophiles (12):</b> Non deviant/deviant arousal: 37% at baseline and 62% after 2-month treatment Arousal for non aggressive and aggressive sexual activity with a child decreased by respectively 37 and 41%
Hunter and Goodwin (1992) USA Open study No comparison group	N=39 Males Sex offenders: 39 Victims: 18% males 38% females Type of paraphilia? Previous history of sexual abuse: 59% Mean age: 15.4 y Comorbidities: Learning disabilities +/-ADHD 59% Mean total IQ: 94	<b>Satiation therapy adapted to adolescents:</b> Sexual thoughts and visual stimuli in conjunction with repetitive and prolonged exposure to deviant and non deviant stimuli (conditioning paradigm of extinction) 4 sessions (1 h)/week <i>Plus</i>	<i>Timepoints:</i> Prior to treatment Every month <i>Outcome measures:</i> <b>Plethysmography:</b> Auditory stimuli (conventional and deviant sexual behaviour)	<b>Plethysmography:</b> At month 6: no difference At month 9: Deviant score significantly decreased as compared to baseline with verbal satiation only in 27/39 cases Age at time of admission was correlated with the deviance score at month 9

(continued)

Table I. Continued

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
Kaplan et al. (1993) USA Open study No comparison group	N=15 Males Sex offenders Type of paraphilia: 14 paedophiles heterosexual, 1 bisexual No non sexual crimes Previous history of sexual abuse? Mean age: 15.4 y (13–18) Denial 95% Comorbidities: No drug or alcohol abuse	Individual group and family therapies insight-oriented and problem solving nature Duration of treatment: 6 months Duration of follow-up: 6 months At 3 months: +15 min covert sensitisation In 12 cases: 3 additional months of verbal plus laboratory satiation (slides and plethysmography) In 27 cases: verbal satiation for 3 add- itional months <b>Verbal satiation</b> 8 individual verbal satiation sessions (30 min sessions for 8–13 weeks or 90 days maximum) If arousal to deviant sexual stimuli >20% (only 5 cases): CBT was used for 40 weeks Duration of follow-up?	Timepoints: Prior to treatment After verbal satiation (within 4 to 30 days) Outcome measure: <b>Plethysmography</b>	Decrease in arousal for deviant stimuli in 14/15 cases but in 5 cases erec- tion > 20% for deviant sexual stimuli Baseline: arousal 70% (range: 29–100) After 8 sessions: 34% (except for 1 case: increase from 60 to 96% instead of decrease) In 2 young subjects: pre-treatment arousal 100% and post treatment arousal: respectively 69 and 78% <b>Plethysmography</b> Video: IT: decreased arousal in % of full erection Male victims: 18 to 12 Female victims: 38 to 23 Waiting list: no decrease Audio: Male victims: IT statistically significant decrease from 63 to 44 Female victims: IT statistically significant decrease from 90 to 63 Waiting list: no decrease Slides: Female victims: IT statistically significant decrease from 47 to 23 Waiting list: decrease from 55 to 45 Parents' reports: 50% of parents thought that IT greatly improved their sons Self-reports: 78% of youths found IT > than their core treatment Potential biases: Treatment not fully portable Upper limit of the number of trials (each vignette can be seen 3 or 4 times
Weinrott et al. (1997) USA Randomly allocated in 2 groups	N=69 Males Sex offenders Type of paraphilia: Paedophiles (among 108 with plethys- mography: 24 withdrew, 15 had low deviant behaviour) Previous history of sexual abuse? Mean age? Comorbidities? No statistical differences between the 2 groups before treatment	Peer group programmes, individual and family therapy <b>Vicarious sensitisation (IT)</b> (N=35): 25 sessions, twice a week (crime scenario and aversive vignettes audiotaped) <b>Comparison group (N=34):</b> 3 month-waiting list Duration of treatment: 6 months Duration of follow-up: 6 months	Timepoints: Baseline At 3 months At 6 months Outcome measures: <b>Plethysmography:</b> using audiotapes description of consen- sual and deviant sexual behaviour and visual slides of child with bathing suits <b>Scales:</b> –Adolescent sexual interest card sort: 64 items subjective arousal to sexual scenarios –Self-perception profile: 45 item self- report scale Youths and parents' reports	<b>Plethysmography</b> Video: IT: decreased arousal in % of full erection Male victims: 18 to 12 Female victims: 38 to 23 Waiting list: no decrease Audio: Male victims: IT statistically significant decrease from 63 to 44 Female victims: IT statistically significant decrease from 90 to 63 Waiting list: no decrease Slides: Female victims: IT statistically significant decrease from 47 to 23 Waiting list: decrease from 55 to 45 Parents' reports: 50% of parents thought that IT greatly improved their sons Self-reports: 78% of youths found IT > than their core treatment Potential biases: Treatment not fully portable Upper limit of the number of trials (each vignette can be seen 3 or 4 times

(continued)

Table I. Continued

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
Worling and Curwen (2000) and Worling et al. (2010) USA Open study	<p><b>N=148 (9 females)</b></p> <p><b>Sex offenders:</b></p> <p>Moderate risk of reoffending</p> <p><b>Type of paraphilia:</b></p> <p>3 exhibitionists, paedophiles?</p> <p><b>Previous history of sexual abuse?</b></p> <p>Mean age: 15.5 +/1.5 (range 12–19)</p> <p><b>Treatment group:</b></p> <p>N=53 males and 5 females</p> <p><b>Comparison group:</b></p> <p>N=86 males and 4 females</p> <p>No group differences</p> <p><b>Comorbidities:</b></p> <p>IQ in the normal range</p>	<p><b>Treatment group SAFE-T:</b></p> <p>Treatment group: 58 including drop out &gt;12 months (18/58)</p> <p><b>Sexual abuse Family and Education SAFE-T programme:</b> a community-based programme for sexual abuse treatment (individual (100%), group and family treatment (71%))</p> <p>CBT intervention with family focus</p> <p>Treatment goals are reviewed every 4–6 months and individualised to meet each adolescent's needs</p> <p>Mean duration of treatment: 24.4 months (range: 16–24)</p> <p><b>Comparison group:</b> 90 subjects including treatment refusals: 17; treatment drop outs: 27 before 1 y; and 16 no treatment</p> <p>67% of cases in this comparison group received treatment but the nature or duration of treatment is unknown</p> <p><b>Duration of follow-up:</b> 6 years (range: 2–10 years)</p> <p><b>Study published in 2010:</b></p> <p><b>Duration of follow-up:</b> 16.2 y (range: 12–20)</p>	<p><b>Timepoints:</b></p> <p>Baseline and end of follow-up</p> <p><b>Outcome measures:</b></p> <p><b>Scales:</b></p> <p>–Assessment environment scale AES III (punitive early family environment)</p> <p>–Tennessee Self-Concept Scale TSCS (self-esteem and self-criticism)</p> <p>–Youth Self-Report (social competencies and problem behaviour)</p> <p>–Beck Depression Inventory BDI</p> <p>–Buss Durkee Hostility Inventory BDHI (hostility)</p> <p>–Socialization Scale (from the California Psychological Inventory) (impulsive and antisocial traits)</p> <p>–Child Molest and Rape Total Scales from the Multiphasic Sex Inventory Juvenile Male Research Edition (MSI-J-R) (self-report) (child molest and rape)</p> <p><b>Criminal charges</b> (sexual and non sexual, national database)</p>	<p>before decreasing its aversive power)</p> <p>Restricted to child molesters</p> <p>Long-term effect?: longest study 3 months</p> <p><b>Follow-up: 10 years</b></p> <p>Recidivism in the treatment group: 3 cases</p> <p>Significant differences between comparison and treatment groups for any criminal offence (54 vs. 35% <math>p&lt;0.01</math>); for violent non sexual recidivism (32 vs. 19% <math>p&lt;0.05</math>); for non violent non sexual offences (50 vs. 21% <math>p&lt;0.01</math>) and for sexual recidivism (18 vs. 5% <math>p&lt;0.05</math>)</p> <p>Recidivism was associated with child interest but not with previous non sexual delinquency</p> <p>Previous history of sexual abuse was not related to sexual recidivism</p> <p><b>Follow-up: 20 years</b></p> <p>Overall rate (for all 148 participants) for any, non-violent, non sexual, violent non sexual and sexual recidivism was 49.3% (73 of 148), 42.6% (63 of 148), 32.4% (48 of 148), and 16.2% (24 of 148), respectively.</p> <p>Treatment group: significantly less likely to be charged for a sexual reoffense: Chi square 4.41; a non sexual violent reoffense Chi square 4.35; a non-violent reoffense: Chi square 10.57; or any criminal reoffense: Chi square 6.37.</p> <p>Recidivism rates at 20-year follow-up:</p> <p>Any offence: Treatment vs. Comparison 38% (22/58) vs. 57% (51/90)</p> <p>Sexual offence: Treatment vs. Comparison 9% (5/58) vs. 21% (19/90)</p> <p>Relative risk of relapse: 0.41 (CI: 0.16–1.03)</p> <p>Drop outs:</p> <p>27 early drop outs (&lt;12 months) transferred to the control group</p> <p>18 after 12 months</p> <p>Significant differences between the pre-treatment group and the two other groups except for the Empathy scale</p>
Eastman (2004) USA Three different groups pre- and post-treatment Open study No comparison group	<p><b>N=100/138 Males</b></p> <p><b>Court-ordered sex offenders:</b></p> <p>Prior sexual charges: 30%</p> <p>Prior criminal charges: 47%</p> <p><b>Type of paraphilia:</b></p> <p>Mean age: 17.2 y (range: 13–22)</p>	<p><b>Residential sex offenders programme</b> for incarcerated adolescents: no other information. Treatment not described</p> <p><b>CBT?</b></p> <p><b>Duration of follow-up?</b></p> <p><b>Three different groups were compared:</b></p>	<p><b>Timepoints:</b></p> <p>Pre- and post-treatment</p> <p><b>Outcome measures:</b></p> <p><b>Scales:</b></p> <p>– Cognitive distortions:</p> <p>Molest and Rape scales 38 items related to</p>	(continued)



Table I. Continued

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
Eastman 2005 USA (38 additional cases) No comparison group	<i>Previous history of sexual abuse:</i> 50–60% <i>Comorbidities:</i> Mean total IQ 91 In 32% of cases: past history of psychiatric care	Pre-treatment: 40–56 cases Post-treatment pre-release: 40–63 cases Post-treatment post release: 20 cases No significant differences between the 3 groups except for IQ 19 had not successfully completed treatment	cognitive distortions about sexual assault of children and 36 items related to cognitive distortions about sexual violence against women (rated from 1 strongly disagree to 4 strongly agree) –Sexual knowledge questionnaire –Attitude and value inventory related to sexual behaviour, 70 questions, Lickert-5 options responses –Empathy: Interpersonal reactivity index, 28 items, Lickert-5 option responses –Index of self-esteem, 25 items, Lickert-5 option responses	Treatment efficacy
Waite et al. (2005) USA No random assignment to treatment groups	<i>N</i> = 256 Males <i>Sex offenders:</i> Criminal conviction for a felony before treatment: 67% <i>Type of paraphilia:</i> SCI programme as compared to outpatient programme (higher total IQ, more history of sexual abuse, fewer prior offences, more child molestations) <i>Previous history of sexual abuse?</i> <i>Mean age?</i> <i>Comorbidities?</i>	<b>SCI-CBT:</b> 144 cases Self-contained intensive programme (housed in dedicated units for sex offenders), sex offender CBT including relapse prevention <b>Outpatient sex offender specific CBT:</b> individual or group sessions: 112 cases (Wieckowski et al. 2004) <i>Duration of follow-up:</i> 10 years	<i>Timepoints:</i> <i>Outcome measures:</i> <b>Scales:</b> J-SOAP scale <b>Re-arrest rates</b>	Self-contained treatment vs. outpatient programme: –Rates for re-arrest 4.9 and 4.5, respectively –At risk for a sex offence for 5 years 56.2 vs. 69.3 for 6 years –All offences 27.8 and 39.3 (statistically significant from baseline) and longer mean time to re-arrest (64 vs. 47.8)
Thoder and Cautilli (2011) USA No comparison group	<i>N</i> = 39 Males <i>Sex offenders</i> <i>Type of paraphilia?</i> <i>Mean age:</i> 14–17 y <i>Previous history of sexual abuse?</i> <i>Comorbidities?</i>	<b>CBT:</b> Mode deactivation therapy (theory of a network of cognitive, motivational, affective and behavioural components that create a personality) Weekly individual or group sessions involving imaging and relaxation <i>Duration of follow-up:</i> 1 year	<i>Timepoints:</i> Baseline and post-treatment <i>Outcome measures:</i> <b>Scales:</b> –Devreux Scale of mental Disorders: DSMID –Child Behaviour Check List: CBCL –Beliefs about victims –Beliefs about aggression –JSOP-A (if >28: high risk of sexual offending)	Significant decrease in antisocial behaviour Pre- and post-treatment scores: JSOP-A: 28.5 to 22.2 BSP (composite score including all scales): 10.25 to 4.9 After 1 year: recidivism 7% (no sexual offence) (4/7 related to drugs)
Edwards et al. (2012) UK Open study No comparison group	<i>N</i> = 34 Males <i>Sex offenders:</i> 47% <i>Victims:</i> Adult or peer only 21% <i>Type of paraphilia:</i> <i>Paedophiles:</i> 35% <i>Mean age:</i> 14 y 3 months (range: 11.6–16.3) <i>Previous history of sexual abuse:</i> 47%, <i>Comorbidities:</i> 35% learning disabilities 6% ADHD + 9% suspected	<b>SWAAY a multicomponent treatment facility</b> for sex offenders: residential care in groups, education and therapeutic interventions Weekly CBT based programme (3–5 weeks modules concerning sex relationships, decision making, rights and responsibilities and victim focus, relapse prevention) <i>Plus</i> Individual interventions based on CBT	<i>Timepoints:</i> Pre- and post-treatment <i>Outcome measures:</i> <b>Scales:</b> –Adolescent Sexual Abuser project (1997) extension of the STEP programme to adolescents: evaluate psychological functioning and sexual behaviour of adolescent sex offenders and offence-related attitudes and beliefs and impulsivity	Positive significant improvement of all measures except for impulsivity All offence-related scales improved significantly post treatment and the proportion of “I don’t know” was 0 post treatment ERASOR 2.0 scores: significant improvement post treatment Biases: Non anonymous questionnaires

(continued)

Table I. Continued

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
McConaghy et al. (1989, 1990) USA Subjects randomly allocated to one treatment Two studies (respectively 20 and 30 subjects) No specific focus on adolescents	6% autism + 6% suspected 53% conduct disorders  N=45 (6 adolescents) Males Sex offenders: 3 were charged for sex offences None adolescent ask for voluntary treatment  Type of paraphilia: 2 homosexual paedophiles, 1 heterosexual paedophile, 1 exhibitionist, 2 fetishists including 1 attempted rape Mean age: range: 14–19 y Previous history of sexual abuse? Comorbidities: 1 had mental retardation	25 cases completed the main programme Duration of follow-up: 3 years  <b>STUDY 1:</b> Covert sensitisation CS: 10 cases <b>Imaginal desensitisation ID:</b> 10 cases (sexual stimuli excitation controlled by relaxation) 1 week course of 14 sessions (15–20 min) <b>STUDY 2</b> <b>Imaginal desensitisation ID:</b> 10 cases <b>Medroxyprogesterone MPA:</b> 10 cases (150 mg i.m./15 days for 4 injections, then 4 injections per month – 6 months in total – <b>Imaginal desensitisation ID</b> + <b>Medroxyprogesterone MPA:</b> 10 cases Duration of follow-up: at least 1 year	–ERASOR 2.0 (psychosocial functioning, sexual interests and behaviour)  Timepoints: After 1 month and after 1 year Treatment adjusted if necessary Outcome measures: Self-report scales <b>Recidivism rates</b> No plethysmography	Contribution of the therapeutic milieu? No reconviction follow-up study  Lower efficacy as compared to adults at 1-year (not significant) but the decrease became significant during the following years 1 adolescent with low IQ was resistant Recidivism rates in adolescents: 4/6 adolescents required additional treatment as compared to 7/39 adults (statistically significant) during 2 to 5 years after the end of the study 3/6 adolescents reoffended vs. 3/39 adults History of reoffenses in adolescents: –14 y low IQ homosexual paedophile: sexually offended at months 7 and 10 after CS then use of 1 week aversive therapy and no recidivism after 5 years –15 y fetishist: recidivism after ID then use of 1 week aversive therapy and recidivism then 6 month-MPA treatment and recidivism after 1 year and then 1 week aversive therapy with good control of fetishism –18 y exhibitionist and sexual molester: MPA treatment, after 3 injections reduction of deviant behaviour but still present then 1 week ID, then MPA 150 mg/15d for 7 months then monthly, and after 4 months, sexual reoffense, then 150 mg/15d plus 1 week aversive therapy, deviant sexual behaviour still present but under control and then gradually decreased after 25 months with minimal urges under control –19 y homosexual paedophile: 6 months MPA treatment, 2.5 years later he sexually offended, then another 6 months MPA treatment with no deviant urges for the next 2 years –1 heterosexual paedophile: no deviant behaviour for 4 years after cessation of ID –1 fetishist: ID + MPA: no deviant behaviour for 4 years after cessation of treatment Biases: Insufficient duration of treatment? Heterogeneity of the sample Not designed for adolescents

were measured. In contrast to the previous study, in this particular study, there was no difference in outcome between offenders with a preference for female victims or male victims.

- (4) Hunter and Goodwin (1992) reported on a study of 39 male adolescent sexual offenders (including a high proportion of learning disabilities and ADHD as comorbidities), who participated in a residential treatment programme, which included a minimum of 6 months of verbal satiation treatment (Table I). In addition, individual, group and family psychotherapy, which was non-behavioural and insight-orientated, was also used. Outcome measures included deviant sexual arousal as measured by penile plethysmographic responses. The results indicated that older adolescent sexual offenders appear to have a greater potential for learning to lower deviant sexual arousal through satiation therapy while maintaining normophilic arousal to age appropriate stimuli and to consensual sexual activity compared to younger adolescent offenders.
- (5) Kaplan et al. (1993) studied a sample of 15 adolescent male paedophilic sexual offenders. They were treated with verbal satiation over a period of between 8 and 13 weeks (Table I). Deviant sexual arousal as measured by penile plethysmography showed a decrease between pre-treatment and post-treatment phallometric testing. As previously reported, it was more difficult to decrease arousal in younger adolescents and also when the age difference between the sexual offender and the victim was low.
- (6) Knox (1994) studied cognitive behavioural and self-instructional training in 25 adolescent sexual offenders. The adolescents were participating in outpatient group therapy as required through a local juvenile court in Texas. This study looked at whether cognitive behavioural and self-instructional training was effective in reducing antisocial behaviour and increasing pro-social behaviour in the study sample. The study was limited but recommendations were made for future research with adolescent sexual offenders.
- (7) Weinrott et al. (1997) studied a sample of 69 male paedophile sexual offenders who were treated with sensitisation procedures similar to covert sensitisation (community-based programme) and randomly allocated in two groups (treatment or comparison group which was: 3-month waiting list) (Table I). The duration of treatment was 6 months. Outcome measures included pre-and post-treatment deviant sexual arousal as measured

by penile plethysmography. In addition some psychological outcome measures were used. The treatment group demonstrated lower deviant sexual arousal post-treatment compared to the control group and to pre-treatment levels related to child female stimuli. For adolescent sexual offenders with a sexual preference for male children and responding to male child stimuli the only significant difference was found between the pre- and post-treatment groups with no difference found between the treated group and the control group.

- (8) Worling and Curwen (2000) studied a sample of 58 adolescent sexual offenders including five females (Table I). The treatment group participated in a community-based outpatient treatment programme consisting of individual, group and family psychotherapy, sexual education, as well as CBT with a relapse prevention orientation for 16–24 months. The programme included: increasing insight, developing offence prevention plans, enhancing awareness of victim impact and social relationships, and reducing the impact of traumatic past-events. Two-thirds of treatment group participated in both group and family therapy in addition to individual therapy. Recidivism (sexual and non-sexual) was the outcome measure and the results indicated that the treatment group had significantly less recidivism for sexual offence (mean duration of follow-up: 6 years), violent and non-violent non sexual offences compared to the control group which consisted of 90 adolescents (including four females) who were treatment drop outs, refusals or other treatments. The comparison group may have introduced a bias even if there were no statistical differences in the variables used for comparison.

In 2010 (Worling et al. 2010), the same group published the results of the same cohort with a mean follow-up duration of 16 years. Nine percent of those adolescents who have participated in at least 10 months of specialised treatment were charged with a new sexual offence during this follow-up period as compared with 21% of those adolescents who did not receive specialised treatment. In total, only 11.5% (17 of 148) of the participants were charged for sexual offences as adults.

- (9) Cooper (2000) studied the recidivism data of 89 convicted adolescent sexual offenders between 1985 and 1998. There was a treatment group ( $n=41$ ) who had participated in a 10-month treatment programme essentially consisting of

CBT in an adolescent sexual offender programme in Canada. There was a comparison group ( $n=23$  adolescent sexual offenders) who were treatment drop outs and received less than 10 months of CBT and ( $n=25$ ) who were treatment refusers or did not receive any specific treatment. A follow-up period of 7 years was used to assess recidivism data based on criminal convictions. The rates of criminal convictions were significantly higher for the treatment drop outs and the treatment non-completed as compared to the treatment group on measures of nonsexual and serious recidivism. The treatment group had a lower rate of sexual offence recidivism (2.4%) than the treatment drop outs (17.4%) and the non-completed group. The study suggested that adolescent sexual offenders who completed a specific treatment for sexual offending behaviour had less sexual recidivism as well as nonsexual and serious recidivism.

- (10) Eastman (2004, 2005) studied, in an open study, without any comparison group, 100 male adolescent sexual offenders court-ordered, who took part in a residential treatment programme without specific information on this programme (38 additional adolescents were included in the 2005 study) (Table I). As, in most cases, CBT was used and we considered this programme as CBT. Three samples were examined, firstly individuals who were just entering the programme; secondly individuals who had completed the programme and were waiting to be released; and finally individuals who completed the programme and had been living in the community for a minimum of 6 months. The three samples were subjected to a number of measures in two stages with a 6-monthly interval. The assessment included: cognitive distortions, sexual knowledge attitudes related to sexual behaviour, empathy and self-esteem. Significant differences between the pre-treatment group and the two other groups were observed except for the empathy scale. Interestingly, two treatment outcome variables assessing the level of offender cognitive distortions related to sexual offending behaviour and three demographic/background variables (level of intellectual functioning, history of witnessing domestic violence and history of personal victimisation) were identified as having the strongest potential to discriminate between offenders who completed treatment and those who did not.
- (11) Waite et al. (2005) looked at 10-year follow-up recidivism of two adolescent sexual offender treatment programmes in 256 male adolescent sexual offenders. This study included only incarcerated adolescent sexual offenders in the state of Virginia, USA (Table I). There was considerable variation in the two treatment programmes both in terms of the therapeutic environment as well as the intensity of treatment. What was judged to be the more intensive treatment programme was a self-contained programme in specialised living units separated from the general incarcerated adolescent offender population (144 cases). The programme that was judged to be less intensive had adolescent sexual offenders in the general population of adolescent offenders as opposed to being in a separate environment (112 cases). Recidivism was based on arrest rates and incarceration rates due to a conviction. The outcome data looked at re-arrest rates, length of time to re-arrest and type of offence (property offences, non-sexual assaults, sexual offences), using a survival analysis. The results showed that, in both groups, actual re-arrest for a non-sexual offence was more likely (31 vs. 47%, intensive versus less intensive programme), whereas for sexual offences this was less than 5% for both programmes (with no difference between both groups). The more intensive treatment programme had a longer survival time prior to re-arrest for all types of offences compared to the less intensive programme. It was also reported that adolescent offenders with high levels of impulsive/antisocial behaviours were more likely to recidivate regardless of what treatment programme they went through.
- (12) Thoder and Cautilli (2011) studied 39 male adolescent sexual offenders who participated in a CBT programme called mode deactivation therapy (Table I). Baseline scores were compared to post-treatment scores (at 1 year) on a number of parameters and indicated a significant decrease in antisocial behaviours and a recidivism rate of sexual offences of 7% after one year without any sexual offences.
- (13) Edwards et al. (2012) completed an evaluation of a CBT residential individual and group treatment programme in a sample of 34 male adolescents (35% paedophiles) with a repeated measures design assessing psychosexual functioning and offence related attitudes based on questionnaires (25 subjects completed the programme) (Table I). Results indicated improvements in overall psychosocial functioning and offence related attitudes post-treatment. A positive significant

improvement of all measures except for impulsivity was observed. There were also clear behavioural and attitudinal changes.

**In summary:** only two CBT studies were randomised (McConaghy et al., 1989; Weinrott et al. 1997) (in the latter study, the comparison group was a 3-month waiting list), eight had no comparison groups, three studies had comparison groups: in one case drop out and treatment refusals were included in the comparison group, in another case, individuals who were just entering the programme or who had completed the programme and were waiting to be released were compared to the treatment group, and in the latter case, CBT was less intensive in the comparison group. In total, more than 800 males and 14 females aged between 12 and 19 years old were included in these studies. Most of them were sexual offenders; comorbidities were not reported in many cases. When the past history of sexual abuse was reported, it was present in more than 50% of cases. The duration of follow-up was very heterogeneous, varying from several months to almost 20 years. Plethysmography was used in four studies published before 1998 and not after. The scales used for outcome measurements were heterogeneous and did not allow any comparison between studies. Re-arrest rates were only assessed in five studies (duration of follow-up >5 years except for one study). Different CBT approaches were used such as: covert sensitisation, verbal satiation, deactivation therapy, imaginal desensitisation, sexual education, relapse prevention, and in some cases, family therapy, were used. In all studies, CBT has reduced the outcome measures considered. In two studies, CBT effectiveness was more important in older adolescents and in two studies, the victim gender preference may have interfered with treatment effectiveness.

#### *Multisystemic treatment (MST) (Table II)*

- (1) Borduin et al. (1990) were the first to describe a structured multisystemic therapy including adolescent and family systemic approach (community- and family-based, ecological model, including treatment at home). The approach included: empowering parents and adolescents deal with denial about offences, safety planning and improving relations with social peers. This first and randomised study reported its efficacy in 16 male adolescent sexual offenders (eight in the treatment group vs. eight in a comparison group receiving a combination of psychodynamic, behavioural and psychotherapeutic approaches). The mean duration of treatment was 4 months. The outcome was based on recidivism rate for sexual offences,

which was 12.5% in the MST group as compared with 75% in the comparison group ( $p=0.04$ ) during a mean follow-up of 37 months. Six patients (three in each group) completed the treatment and in total four out of six were re-arrested for sexual offences (Table II).

- (2) Borduin et al. (2009), have compared the same treatment (MST for a mean duration of 31 weeks) in a sample of 24 male adolescent sexual offenders as compared with 24 male adolescent sexual offenders receiving usual community services (UCS was composed of CBT, group and individual therapy, for a mean duration of 30 weeks). This was a randomised study. The mean duration of follow-up was 9 years and re-arrest was the main outcome used. MST participants had 83% fewer re-arrests for sexual crimes and 70% fewer re-arrests for other crimes than did their UCS counterparts. By the end of the follow-up, 46% of UCS participants as compared to 8% of MST participants, had been arrested at least once for a sexual crime. All other psychological items were also improved in the MST group (Table II).
- (3) Henggeler et al. (2009) and Letourneau et al. (2009), in the same hospital, using community MST, have reported its efficacy in 67 adolescents (in the total sample, three were females). The mean duration of treatment was longer (7 months). In this randomised study, standard comparison treatment included group CBT (treatment as usual) (60 participants). Sexual reoffending was not examined. At 1-year follow-up, youths and parents reported significantly greater reductions of many outcome measures including sexual behaviour problems (77% decline as compared to no decline), antisocial behaviour (decreased by 60% as compared with 18%), substance use and costly out-of-home placements, in the MST group vs. usual treatment respectively (Table II). Treatment completion was mandatory (probation or diversion) and only six subjects in each group failed to complete treatment. MST empowered caregivers to better identified friends who were having a negative influence on juvenile sexual offenders and advised them to stop associating with such friends. At 2-year follow-up (Letourneau et al. 2013), sexual offence re-arrests were examined but the number of re-arrests was too low for statistical analyses. MST positive treatment effects were maintained when sexual behaviour, self-reported delinquency, out-of-home placements were considered.

**In summary:** This combination of well-structured CBT and family therapy seems very promising, especially for



Table II. Multisystemic treatment (MST).

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
Borduin et al. (1990) USA Randomised study	N=16 Males Sex offenders arrested: 6 rapes, 5 sexual assaults, 4 sodomy, 1 exhibitionism Type of paraphilia? Mean age: 14 years Previous history of sexual abuse? Comorbidities: Majority of conduct disorders	<b>Multisystemic therapy (MST)</b> N=8 Adolescent and family systemic approach Mean 37 hours vs. <b>Individual therapy</b> N=8 Combination of psychodynamic, behavioural and psychotherapy Mean 45 hours Mean duration of treatment: 4 months Duration of follow-up: 21–49 months (mean 37)	<b>Timepoints:</b> Pre- and post-treatment <b>Outcome measures:</b> No scales <b>Recidivism rate</b> for sexual offences	Treatment efficacy Drop out: 3 cases in each group Re-arrest rates: In 4/6 cases: re-arrest for sexual offence MST group recidivism rate for sexual offences: 12.5% IT group recidivism rate for sexual offences: 75% p=0.04
Borduin et al. (2009) USA Randomised controlled study	N=48 Males Sex offenders arrested as well as non sexual offences Previous offences mean 4.3 (sexual 1.6 and non sexual 2.7) Moderate baseline risk of reoffending Mean age: 14 ± 2 y No differences between the 2 groups except for more behavioural problems in the MST group Type of paraphilia? Previous history of sexual abuse Comorbidities: No psychosis, no mental retardation	<b>Multisystemic therapy (MST)</b> at home N=24 (Borduin et al. 2003) Duration: 31 wks ± 12 vs. <b>Usual community services (UCS)</b> using CBT N=24 (CBT group, 90 min twice a week + individual treatment 60–90 min once a week) 2 withdrawn in the UCS Duration: 30 weeks ± 18 Duration of follow-up: mean 9 years	<b>Timepoints:</b> Pre- and post-treatment <b>Outcome measures:</b> <b>Scales:</b> –Global Severity Index of the Brief Symptom Inventory (self-report scale 53-item (from 0 to 4)) –Youth behaviour problems: 89 item form, 0 to 2 –Revise Behaviour Problem Checklist (report by parents) –Family Adaptability and Cohesion Evaluation Scales II (parents and youth reports) 30-item (1–5) –Missouri Peer Relations Inventory (parents, youths and teachers reports) 13-item (1–5) –Self-report delinquency scale: 40-item <b>Number of offences</b> Number of days of incarceration Re-arrest: sexual assault or attempted sexual assault	<b>Post-treatment:</b> MST participants had 83% fewer arrests for sexual crimes than UCS and 70% fewer arrests for other crimes than the UCS group <b>After 9 years:</b> MST participants spent 80% fewer days in detention facilities than UCS Reoffenders: 2/24 MST vs. 11/24 in the control group Relative risk of reoffending: 0.18 (0.04–0.73) Re-arrest rates for sexual and non-sexual crimes: 45.8% of UCS for sexual crimes and 58.3% for a non sexual crime compared with 8.3 and 29.2% respectively of MST cases Cox proportional hazards tests showed small to medium effect sizes for MST versus UCS (sexual offences, beta = 0.124, p = 0.007; non sexual offences, beta = 0.433, p = 0.050). All other items were significantly improved in MST and deteriorated in UCS Drop outs: MST: Ovs. 2 in UCS
Henggeler et al. (2009) USA Randomised study And Letourneau et al. (2009, 2013)	N=127 124 Males <b>3 Females</b> Sex offenders 35% of youths had no sexual offences Treatment completion was mandatory (probation or diversion) Type of paraphilia? Mean age: 14.6 y (range 11–17) Previous history of sexual abuse? Comorbidities: No psychosis, no mental retardation	<b>Multisystemic therapy (MST)</b> at home delivered by community-based practitioners N=67 Mean duration of treatment: 7 months vs. <b>Standard treatment (TAU)</b> N=60 Primarily group-based CBT including: weekly group-based treatment with decreasing deviant arousal, increasing victim empathy, addressing cognitive distortions,	<b>Timepoints:</b> From baseline through 2-year follow-up Evaluation at 6 and 12 months Evaluation at 24 months <b>Outcome measures:</b> <b>Scales:</b> –Externalising 7 scores of the Youth Self-Report (YSR) and of the Child Behaviour Checklist (youth externalising behaviours.)	Drop out: 6 in each group <b>At 1 year:</b> Caregiver reports of youth sexual risk/misuse declined by about 77% for youths in the MST vs. minimal decline for youth in the TAU Self-reported delinquent behaviour and substance use decreased by respectively 60 and 50% in the MST vs. 18% and an increase of 65% in the TAU The probability that an MST youth was in an

(continued)

Table II. Continued

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
		relapse prevention, and family counselling. Mean duration of treatment: 14.6 months, and 8.2 months for diverted youths <i>Duration of follow-up: 2 years</i>	<ul style="list-style-type: none"> <li>–The Child Behaviour Checklist (CBCL) (youth mental health functioning)</li> <li>–40-item Self Report Delinquency Scale (SRD)</li> <li>–General Delinquency subscale during the previous 3 months</li> <li>–Two items from the Personal Experience Inventory (PEI) (frequency of self-reported alcohol and marijuana use for the previous 3 months)</li> <li>–Adolescent Sexual Behaviour Inventory, a 45-item instrument (inappropriate sexual behaviours reported by youth and parents (2 subscales were used))</li> </ul>	Treatment efficacy out-of-home placement (i.e., detention, residential treatment, foster care) during the past 30 days remained approximately 7% vs. an increase from 8 to 17% in the TAU group <b>At 2 years:</b> MST treatment effects were maintained for 3 of 4 measures of youth problems: sexual behaviour, self-reported delinquency, out-of-home placements. The base rate for sexual offence was too low for statistical analyses and no between-groups difference were observed for other criminal arrests

Sexual offence re-arrests

sexual offences but has only been studied by one North American group. It needs to be replicated by other groups. The studies were randomised and the comparison groups were using, in most cases, CBT as usual, a hundred adolescents (mainly sexual offenders, including three females) were receiving MST.

### Psychosocial education

- (1) Hains et al. (1986) included 17 males who were in a state treatment facility for delinquent adolescents between 16 and 18 years of age. They participated in group-sessions, which were educational and focused on sexual education, improving psychological attitudes, problem solving and moral judgment training. Nine subjects of the sample were engaged in treatment while eight were in a waiting-list control group. Outcome measures included scores on sexual knowledge assessment, psychological attitudes, problem-solving and moral judgment. The results indicated a slight but significant difference with regards to attitudes towards sexual behaviour and social competence.
- (2) Kaplan et al. (1991) studied a sample of 213 males, 12–19 years of age. However, only 19 were included in the final analysis. They took part in a programme including a small number of sessions of sexual education and a 40-week CBT programme (group format) which consisted of cognitive restructuring, covert sensitisation, social skills training, anger control training, relapse prevention. Outcome measures were based on an educational test. The results showed an improvement in scores for those who completed treatment.
- (3) Bremer (1992) studied a sample of 193 male sexual offenders, aged 14–16 years old, included in a juvenile sexual offender programme that specifically was an intensive programme to treat serious juvenile sexual offenders. They were released between 1982 and 1991. These psychoeducational programmes addressed issues such as personal accountability, life history, personal victimisation, sexual-assault cycle and victim empathy. There was also a long-term post-treatment follow-up focusing on recidivism rates. The results of this follow-up showed that participation in the programme produced lower recidivism rates.
- (4) Mazur and Michael (1992) studied an outpatient treatment programme for adolescents that had sexually inappropriate behaviour. This programme was family-based and consisted of a 16-week group intervention protocol that included human sexuality interaction, education and relapse

prevention with a transition to follow-up. Follow-up for the programme ( $n=10$  cases) for 6 months showed no inappropriate sexual behaviour.

- (5) Graves et al. (1992) reported on a sample of 18 males between 12 and 19 years of age who were referred to an inpatient treatment centre and participated in an adolescent social skills affective fitness-training programme. A control group ( $n=12$ ) consisted of males 13 to 18 years of age randomly assigned. Outcome measures included social skills ratings and other psychometric rating scales. Results showed that those in the treatment group demonstrated more frequent use of social skills taught than those in the control group. There were also improvements in other areas including parent-adolescent communication.
  - (6) Lab et al. (1993) studied a sample of 46 males with a mean age of 14.2 years who participated in a psychoeducational programme addressing sex education, victim empathy, relapse prevention, anger management and personal responsibility. A control group ( $n=109$ ) with a mean age of 14.6 years consisted of adolescents who received non-sexual specific treatment. Recidivism was used as an outcome measure and the results showed that both groups demonstrated low levels of sexual recidivism. No significant differences were found between groups, nor were there significant differences found on any further offences.
  - (7) Dorfman (1993) reported on a multifaceted empathy-training programme designed for population and adolescent sexual offenders. Analysis of pre- and post-treatment scores and 2-month post-treatment levels of empathy was evaluated. No significant differences were found. When pre-treatment and 2-month post-treatment scores were studied, a trend in the direction of increased empathy was found. Physiological measures showed a decrease in heart rate, which has been documented as an empathic response in previous research and this showed a significant decrease.
  - (8) Hagan et al. (1994a) completed a study on recidivism rates of 50 adolescent sexual offenders placed in a state juvenile correctional facility for committing a sexual assault against a child. The recidivism rates were assessed 2 years after the completion of a Serious Sexual Offenders programme. This programme required the offender to take responsibility for the offence, to understand the factors that led to the offence, to learn early warning signs of sexual acting out behaviour, to increase feelings of empathy, and to develop appropriate noncriminal pro-social behaviours.
- At follow-up, 46% had committed further criminal behaviour consisting of 20% personal injury offences and 26% property offences with only 8% being sexual offences.
- (9) Hagan et al. (1994b) reported on a sample of 50 males who were committed to a secure residential facility and who were defined as adolescent rapists. In this facility, they were involved in a group treatment programme focused on responsibility, relapse prevention and victim empathy, general and special education and sex education. Recidivism was the outcome measure and 58% of the sample was convicted of another crime with 10% convicted of a sexual offence.
  - (10) Hagan and Gust-Brey (2000) studied a sample of 50 males aged 12–19 years old committed to a secure residential facility and who were involved in groups geared towards responsibility, relapse prevention and victim empathy. Recidivism was the outcome measure. At 10 years of follow-up, 20% had committed another sexual offence, 46% had committed a personal injury offence and 20% property offences.
  - (11) Heran (2005) studied 40 participants, 14–20 years of age, admitted to a residential treatment programme for adolescent sexual offenders. They agreed to participate in an expert mental group therapy programme designed to enhance global empathy capacities. A sample of 31 completed the experimental (12 sessions of 6 weeks) global empathy group programme. The rest of the sample ( $n=9$ ) was selected as a control group and continued to receive traditional victim empathy group therapy. Various questionnaires were used to assess outcome. Overall the group receiving the experimental group treatment showed greater scores in empathy than the control group.
- In summary:** Psychosocial education was an unclear combination of CBT and education mainly focused on sexual attitude and the improvement of victim empathy. Only four studies (Hains et al., 1986; Graves et al. 1992; Lab et al. 1993; Heran 2005) had comparison groups receiving non-specific treatment or a waiting-list control group. Psychosocial education treatments were principally delivered in peer group settings. In total, more than 500 male adolescent sexual offenders (no females) were included in these programmes. Recidivism rates were used as outcome measures in about half of studies, 8–20% recidivism for sexual offences was observed depending on the duration of the follow-up (10 years when the recidivism rate was 20%). In the other studies different outcome measures were used and cannot be

compared except for victim empathy, which was improved. Generally, due to the various and uncontrolled study designs used, the results were not convincing.

### Pharmacological treatments (Table III)

No controlled studies were conducted in juvenile sexual offenders using pharmacological treatments. Several case reports were published as described below and in Tables I and III (McConaghy 1990). According to the "McGrath et al. 2009" survey conducted in North America (McGrath et al. 2009), selective serotonergic reuptake inhibitors (SSRIs) were used in 20% of adolescent juvenile sexual offenders, whereas antiandrogen treatments were used in 25% of male adolescent sexual offenders. Caution is warranted in children and young adolescents because the effects of antiandrogens on the normal growth and development of youth are not known. The American Academy of Child and Adolescent Psychiatry (AACAP; Shaw 1999) recommended the use of antiandrogens to be limited to the most severe cases and discouraged their use with youth under the age of 17.

### Psychotropic drugs

Several case reports and uncontrolled studies (mainly involving adults) reported the efficacy of clomipramine (one case report) and SSRIs (mostly fluoxetine and sertraline) in the treatment of paraphilic disorders.

- (1) Bradford (1993) has reported successful treatment with clomipramine (150 mg/day) within 2–3 weeks in a sexually obsessive–compulsive 17-year-old boy who had been referred for fetishism and pervasive lust-murder fantasies directed at 10-year-old girls. He also had a temporal lobe abnormality with EEG abnormalities. This type of lesion has been reported in sexually sadistic individuals. He had already been treated with MPA in another psychiatric centre, but discontinued it because of minor breast enlargement. He was referred for an inpatient forensic psychiatric evaluation. Violent sexual fantasies of raping and strangling or suffocating 10-years-old girls were pervasive. Phallometric testing showed a sexual preference for paedophilia and sexual sadism. Because of his reluctance to continue antiandrogen treatment, he was treated with clomipramine, 150 mg/day. Repeated phallometric testing showed almost complete suppression of sexual arousal to rape, as well as paedophilia. Follow-up over a number of years showed no recurrence of these problems.

- (2) Galli et al. (1998) reported the efficacy of fluoxetine (40 mg/day) over the course of 1 year in a 17-year-old male who met DSM-IV criteria for multiple paraphilias including paedophilia, frotteurism, sexual sadism, zoophilia, necrophilia and also exhibitionism and voyeurism. Bipolar type II disorder and obsessive–compulsive disorder were comorbid disorders (Table III). Paraphilic urges and behaviours, depression and violent obsessions improved with fluoxetine after not responding to long-term residential treatment (group therapy for 1 year and 5 months).
- (3) Aguirre (1999) reported the case of a 16-year-old male who met DSM-IV criteria for post traumatic stress disorder and paraphilia not otherwise specified. He was admitted to a residential programme where he sexually molested a number of his peers. Olanzapine 5 mg/day and sertraline up to 50 mg/day were not successful. Fluoxetine was prescribed up to 60 mg/day. Upon discharge from hospital, after 17 days of inpatient treatment, he expressed a marked decrease in symptoms. There was no follow-up after discharge.
- (4) In Greenberg et al. (1996) retrospective open study, the efficacy of fluvoxamine, fluoxetine and sertraline was studied in paraphilic patients aged from 17 to 72 years. Paraphilic fantasies were significantly decreased in the three groups with no differences in efficacy between the three SSRIs but no specific focus was made on adolescents.
- (5) In the same way, Bradford (1995) conducted a 12-week open-labelled, dose-titrated study of sertraline in 18 paedophiles over 16 years of age with comorbid mood disorders. Improvement in self-report scales and penile plethysmography measures were observed with sertraline but again the results obtained in the adolescent subgroup were not separately analysed.

On the one hand we are unable to treat paraphilic disorders or sexual deviant behaviour specifically, but on the other hand we know successful treatments of some target symptoms associated to paraphilic disorders, such as serotonergic compounds which might be helpful in decreasing impulsiveness and aggressiveness (Carrillo et al. 2009). Pharmacological approaches for treating violent and criminal behaviour in psychopathic persons have been generally disappointing, with some, but important exceptions (for review Cummings 2015). The first exception regards lithium, which may reduce impulsive violence and irritability in a group of chronically aggressive adult prisoners (for review, Thibaut and Colonna 1992). However, it did not alter instrumental violence or overall criminality. However, lithium has a

Table III. Pharmacological treatments.

References	Characteristics of the patients	Methods		Results
		Treatment conditions	Outcome measures	
Galli et al. (1998) Case report	N=1 Male Age: 17 y <i>Type of paraphilia:</i> Paedophilia, zoophilia, necrophilia, sexual sadism, exhibitionism, frot- teurism, voyeurism <i>Comorbidities:</i> Bipolar disorder type 2, OCD	Fluoxetine: 40 mg/d	<i>Outcome measures:</i> Self-report	Disappearance of deviant sexual thoughts from 4 weeks post-treat- ment to 1 year
Ryback (2004) Open prospective study No comparison group	N=21 Males <i>Sex offenders</i> <i>Mean age:</i> 15 y (range: 13–17) <i>Type of paraphilia:</i> 19 heterosexual paedophiles, 1 homosexual paedophile, 1 bisexual <i>Victims:</i> children 2–12 y, number: 1–37 <i>Previous history of sexual abuse:</i> 6 cases <i>Comorbidities:</i> 11 ADHD, 5 substance abuse 8 depression, 4 IED, 3 PTSD	<b>CBT treatment:</b> 9 patients discharged before the end (mean 26 weeks) Naltrexone: 100–200 mg/day Mean dose: 160 mg/day Mean duration of treatment: 12.1 y (range: 4.5 to 21) Leuprolide: 3.75 or 7.5 i.m. per month Concomitant medications: (antidepressants 8 with no efficacy of SSRIs, antipsychotics 6, mood sta- bilisers 5, stimulant medications 11) <i>Duration of follow-up?</i>	Naltrexone used if excessive masturbation, erection out of control, sexual fantasies >30% of awake time Leuprolide used if no efficacy of naltrexone after 3 months <i>Outcome measures:</i> Self-reports of daily sexual fantasies and masturbation number If decrease >30% for at least 4 months: considered as positive effect	In 20/21: 100 mg/day naltrexone but no duration of efficacy In 19/20, dosage increased: –in 9 cases: to 150 mg/day –in 11 cases: to 200 mg/day (10/11 initial benefit) but: In 6/11 cases: decreased efficacy after 3 months In 5/11 cases: ongoing benefits In total, in 15/21 cases: masturbation: 3/week and sexual fantasies: 1/day In 5/6 cases: good efficacy of leupro- lide at 3.75 to 7.5 mg/month (used in more severe patients at baseline)

y, years; MPA, medroxyprogesterone acetate; SSRIs, selective inhibitors of serotonin reuptake; ADHD, attention deficit and hyperactive disorder; PTSD, post-traumatic disorder; IED, intermittent explosive disorder; CBT, cognitive behaviour therapy.



narrow therapeutic window and needs blood concentration monitoring. The second exception is clozapine, which reduced impulsive behavioural dyscontrol and anger, resulting in a decrease in violence incidents, in six of seven adult patients with severe antisocial personality disorders. Clozapine serum levels for six of the seven patients were in the range 150–350 ng/ml (Brown et al. 2014). However, clozapine treatment must follow a reglemented plan to monitor haematological side effects. In the same way, Pattij and Vanderschuren (2008) published an overview of the neuropharmacology of impulsive behaviours, which might be helpful. In special populations such as children and adolescents with autism spectrum disorders or intellectually disabled juvenile sexual offenders, Ji and Findling (2015) as well as Häßler and Reis (2010) recently published updates.

Among these pharmacological treatments options, SSRIs are the most interesting option for juvenile sexual offenders. Clozapine should only be used in some cases of treatment-resistant schizophrenic patients with delusional deviant sexual fantasies or behaviours and, lithium, in bipolar patients with comorbid paraphilic disorders.

### **Antandrogen treatments**

The pharmacological properties of the different types of antiandrogen treatments were already described (Thibaut et al. 2010; Garcia et al. 2013). There have only been a few case reports of antiandrogen treatments in juvenile sexual offenders. Most of the case reports involved cyproterone acetate (CPA) treatment of adolescents with mental retardation. Four additional subjects were receiving MPA, and seven subjects, gonadotrophin releasing hormone agonists (GnRHa) (in six cases, GnRHa treatment was used in naltrexone-resistant patients). There were no controlled studies.

- (1) Bradford (1993) published the case of a mildly mentally retarded 16-year-old adolescent with a plastic bag fetish and paedophilia. He was successfully treated using CPA. Phallometric testing had shown a clear sexual preference for paedophilia. His behaviour was potentially homicidal towards children, when he started to place plastic bags over the heads of young children. Five years of follow-up in the community showed no evidence of any recurrence of any sexual offence recidivism.
- (2) Ott and Hoffet (1968) reported the efficacy of CPA in a sample of 26 sexual offenders, hypersexual males and psychiatrically ill subjects, as well as in patients with epilepsy and mental retardation,

ranging in age from 14 to 74 years. No specific focus was made on adolescents.

- (3) Davies (1974) reported the efficacy of CPA in nine juvenile patients with mental retardation who masturbated in public. He also described the efficacy of CPA in three adolescent males with severely mental retardation, who were physically aggressive to other patients and staff and who showed no response to conventional treatment. In addition, four cases of sexual hyperactivity associated with chromosomal disorders in adolescent males were treated effectively with CPA.
- (4) McConaghy et al. (1989, 1990, randomised studies, see Table I) have compared MPA alone or in combination with imaginal desensitisation or covert sensitisation in a group of 45 male sexual offenders including six adolescent sexual offenders (14–19 years old) (see Table I for methodology). Then, MPA was used as an add-on and intermittent treatment in four out of six adolescent sexual offenders when CBT was not sufficient during 2 to 5 years after completion of the study. Three of the six adolescents reoffended. In three of six cases, MPA was not successful in combination with CBT (imaginal desensitisation) (the paraphilic disorders were respectively: fetishism, exhibitionism, and homosexual paedophilia). In the latter case, recidivism occurred after 2 years of MPA treatment interruption and MPA was successful when reintroduced for 6 months (no recidivism was observed after 2 years of follow-up) (Table III for clinical details of the cases). Side effects were not reported and adolescent sexual offender treatment was not the main objective of this study.
- (5) Thibaut et al. (1993) reported the case of a 15-year-old adolescent exhibitionist (in public areas) with mental retardation in whom low compliance was expected. Since the age of 13, he had been preoccupied with unremitted sexual tension with compulsive masturbation (10–15 times a day) and frequent exhibitionism. The parents and patient gave their informed consent for treatment with a long lasting GnRHa. Pubertal development and growth were achieved. Cyproterone was concurrently prescribed for several months to control the initial increase in testosterone levels (flare-up effect). The patient's deviant behaviour completely disappeared and masturbatory activities decreased to zero within 4–5 weeks of GnRHa treatment. No adverse effects were reported. A 2-year follow-up confirmed this improvement then, the patient withdrew from treatment for non-medical reasons.

(6) Ryback (2004), in an open prospective study, has reported the efficacy of naltrexone in association with CBT in 21 male paedophile juvenile sexual offenders (in-patients) who met any of the self-reported following criteria: (1) excessive masturbation ( $\geq 3$  times per day); (2) feeling unable to control arousal; (3) spending more than 30% of awake time in sexual fantasies; or (4) having sexual fantasies or behaviour that regularly intruded into and interfered with their functioning in the treatment programme. Naltrexone is a long-acting opioid used clinically in alcoholism or drug abuse treatments. This study investigated whether naltrexone can decrease sexual arousal in legally adjudicated adolescent sexual offenders. After having been treated for more than 2 months, 13 patients had their naltrexone administratively stopped, thus providing a before, during, after, and resumption-of-treatment design. Outcome measures were self-report daily sexual fantasies and masturbation numbers. Sexual offence recidivism was not reported. A positive result was recorded if there was more than a 30% decrease in any self-reported criterion and if this benefit lasted at least 4 months. Leuprolide (3.75 or 7.5 mg/month, a GnRHa) was added in case of lack of naltrexone efficacy. In 15 cases, naltrexone efficacy was considered as sufficient, patients continued to respond for at least 4 months to an average dose of 160 mg/day with decreased sexual fantasies and masturbation. Dosages above 200 mg/day were not more helpful. Administrative discontinuation of naltrexone in a subset of 13 patients resulted in reoccurrence of symptoms that began when the tapered dose reached 50 mg/day. Five of six patients who did not benefit from naltrexone (the most severe cases) responded favourably to leuprolide (Table III). The mean duration of leuprolide treatment was 1 year.

### **Failure to successfully complete psychological or pharmacological treatment**

In a retrospective study, Hunter and Figueredo (1999) have tried to identify variables, which were predictive of treatment response, in 121 juvenile sexual offenders who entered a community-based sexual offender treatment programme (86% were court-adjudicated or under court advisement including cases of child molestation in 76%, peer rapes in 9% and exhibitionism in 3% of the cases). Half of the youths were previously arrested for a non-sexual offence. Half of them had a previous history of sexual abuse and drug abuse. The mean duration of

the treatment programme was 22 months. The treatment programme included: weekly specialised group therapy, family therapy and individual therapy based on CBT. Sixty of the 121 remained in the study at 12 months and 28 of the 121 completed the study. Two had recidivated sexually. Lower levels of denial at inclusion predicted successful programme compliance; adjudicated youths were also more motivated for treatment. In addition, youths failing to comply had higher overall levels of measures of sexual maladjustment.

In the current literature, personal characteristics identified as increasing the likelihood of treatment failure include severe history of personal victimisation as well as prior sexual and nonsexual criminal history. Treatment targets identified as having a negative impact on treatment completion include extreme levels of distorted beliefs regarding sexual aggression, deficits in empathic abilities, primitive interpersonal skills, and an observable absence in personal coping skills (Hanson and Harris 2000). Interestingly, these targets may be improved with CBT.

### **Limitations of the studies**

Most of the current literature comes from North America. Since the development of the first comprehensive treatment programme for adolescent sexual offenders in 1975, there have been many studies but the great majority of them did not include any comparison groups, which renders difficult to ascertain the relative effects of treatment on recidivism. In addition, many studies had a short duration of follow-up, which resulted in low recidivism rates.

There is a lack of research focused on pharmacological treatments in juvenile sexual offenders (several case reports and one study whose primary goal was neither youth sexual offenders nor pharmacological treatment efficacy).

Concerning psychological treatments, standard treatment is based on CBT. Yet, it remains very difficult to compare the studies, due to different biases such as heterogeneity of adolescents included, different durations of follow-up, non-comparability of treatment programmes and outcome measures. In most cases, it is difficult to identify the inclusion or exclusion of treatment drop outs and refusers in the treatment group. In addition, CBT, psychoeducational and multisystemic programmes (CBT combined with family therapy) are all based on cognitive behavioural approaches and it is very difficult to disentangle the respective roles of the different approaches used. According to Reh fuss et al. (2013) (sample of 309 adjudicated male juvenile sexual offenders), an

integrated sexual offender treatment programme including both CBT and psychoeducational interventions led to a significant decrease on the scores of the J-SOAP-II but only in the moderate risk of recidivism group. Many studies do not specify the cognitions and behaviours targeted for change, nor do they monitor the areas of functioning selected for change (e.g., empathic functioning, relationship with peers), which might be different between treatment settings (Reitzel and Carbonell 2006). McGrath et al. (2009), in an interesting survey conducted in North America, reported that 80% of programmes responding to the survey were community-based, which are less expensive than residential treatment. Their survey contained the responses of 1379 sex offence specific treatment programmes representing all 50 American states and nine Canadian provinces (involving adult and adolescent sexual offenders). During calendar year 2008, the USA respondents provided services to 53,811 male and female adult, adolescent and children sexual offenders in residential and community settings. The Canadian respondents provided services to 3020 individuals. Over half of all programmes for adolescent males and females used one or more behavioural sexual arousal control techniques. Covert sensitisation was the most common technique (40%). Community programmes for adolescent males and females showed a significant increase since 2002 in the use of minimal arousal conditioning (about 18%), a variation of covert sensitisation (except that the abuser interrupts the chain of behaviours as soon as he (or she) experiences any type of mentally or physically sexually arousing thoughts or feelings (Gray 1995; Jensen 1994)).

In addition, the use of SSRI was reported in respectively 30% of male and 21% of female adolescent sexual offenders in community programmes and respectively 36% and 32% in residential programmes in the USA, and slightly less, around 20%, in Canada. Antiandrogens (medroxyprogesterone acetate and mostly leuprolide acetate; cyproterone acetate is only used in Canada) were used in respectively 3 and 5% of males in community and residential USA programmes as compared to 27% in Canada.

Unfortunately, we found no published data concerning current trends in treatment approaches of juvenile sexual offenders in other parts of the world.

### ***Female juvenile sexual offenders***

There were few females included in the studies, which did not allow separate statistical analyses on this subgroup.

### ***Children with sexual behaviour problems***

There was only one randomised study (Carpentier et al. 2006), which was beyond the scope of this paper.

This study prospectively followed 135 children, 5–12 years of age, with sexual behaviour problems. The randomised trial compared a 12-session group CBT with group play therapy and followed 156 general clinic children with non-sexual behaviour problems as a comparison group. Ten-year follow-up data on future juvenile and adult arrests and child welfare perpetration reports were collected. The CBT group had significantly fewer future sex offences than the play therapy group (2 vs. 10%) and did not differ from the general clinic comparison group (3%). The recidivism rate was 1/64 in the treatment group vs. 7/71 in the comparison group (play therapy group). There were no group differences in nonsexual offences (21%). For children under the age of 13 who offended against other children, there was insufficient evidence to determine if CBT combined with parental support was more effective than standard treatment (group based play therapy and parental support) in preventing sexual offending (Carpentier et al. 2006).

### ***Conclusion of the review***

Adolescent sexual offenders have not been well researched in relation to the presence of sexual deviation or paraphilias (in DSM-5 terms: paraphilic disorders) (American Psychiatric Association 2013).

Adult sexual offenders have been subjected to far more studies and the presence of paraphilic disorders has been well established in various research studies. Yet, even in adult sexual offenders the question remains: how many sexual offenders have a paraphilia or a paraphilic disorder? It is quite clear that not all sexual offenders suffer from a paraphilic disorder. According to Tesson et al. (2012), about 10% of adult convicted-sexual offenders were suffering from paraphilic disorders. As sexual offending behaviour is defined in terms of the criminal justice system, this is not surprising; individuals with an antisocial personality disorder may commit sexual offences as part of opportunistic behaviour when engaged in other criminal behaviours; individuals suffering from other mental disorders such as psychotic disorders or bipolar disorders could easily commit sexual offences without evidence for paraphilic disorders. Even in documented studies of individuals engaged in intra-familial child sexual abuse (incest), when tested for deviant sexual arousal and specifically paedophilic arousal, a significant percentage did not show a paedophilic sexual

preference or deviant sexual arousal of any type (Firestone et al. 2005).

Similarly in adolescent sexual offenders, there is a multi-causation of sexual offending behaviour including for example conduct disorders, whereas a certain percentage of adolescent sexual offenders clearly suffer from paraphilic disorders. The fact that 15% of adolescent sexual offenders have been shown to go on to adult sexual offending behaviour shows that a common characteristic with adult offenders is carried through into adult sexual behaviour. This subgroup represents most likely a subgroup with paraphilic disorders (Caldwell 2002; Worling and Langstrom 2006).

The other important issue is that the actual aetiology of the paraphilic disorders remains unknown and, from a neurobiological, hormonal and familial transmission standpoint, the amount of research is relatively limited (Gaffney and Berlin 1984; Gaffney et al. 1984; Bradford 2001; Kingston et al. 2012; Labelle et al. 2012; Thibaut 2006; Thibaut 2013b; Alanko et al. 2013; Langström et al. 2015). So it is very difficult to approach the pharmacological treatment of adolescents with paraphilic disorders without considerable caution. What is known is that, during adolescence, significant hormonal changes occur with an onset at puberty and these hormonal changes then progress until puberty has been completed. This process is relatively complicated when both hormonal changes and neurotransmitter changes are considered (Bradford 2001). Most significantly, pharmacological agents affecting sexual hormones, specifically antiandrogens, can have a significant impact on puberty and bone growth and can terminate puberty or delay its full presentation (Bradford 2001; Bradford and Fedoroff 2006; Thibaut et al. 2010; Thibaut 2013b; Bradford et al. 2013).

*From this review we may conclude that for the treatment of adolescent sexual offenders:*

- overall, there is a low level of scientific evidence;
- randomised controlled trials are lacking, which can be attributed to the logistic, legal and ethical challenges faced by researchers on such sensitive social issues (Långström et al. 2013);
- research focused on pharmacological treatment is also lacking;
- the effectiveness of segregated treatment units for juvenile sexual offenders has not been proven; however, it is often necessary for the juvenile to be temporarily placed outside of his family home when he has perpetrated against family members.

*The study results indicate the following useful trends:*

- when pre- and post-evaluation is available, it is in favour of the treatment group (as in adults), particularly in juvenile sexual offenders at moderate risk of reoffending;
- drop outs of treatment programmes do worse in the long term than sexual offenders who completed the programme (as in adults);
- differences between “older” and “younger” adolescents are suggested (Hunter and Goodwin, 1992);
- information concerning potential adverse outcomes of treatment is not available;
- motivation for treatment is generally not assessed. Due to the high rate of treatment non-compliance, incorporating into pre-treatment and treatment programmes strategies that minimise attrition may be helpful (Reitzel and Carbonell 2006). In general, adjudicated youths are more motivated for treatment; and
- finally, the important roles that caregiver discipline and youth association with deviant peers play in the development and maintenance of antisocial behaviour have been supported consistently by an extensive correlational and longitudinal literature (Loeber & Farrington 1998).

The AACAP (Shaw 1999) practice parameters for the assessment and treatment of children and juveniles who are sexual abusers recommend the following aims for CBT: decreasing deviant sexual arousal; facilitating non-deviant sexual interests; promoting victim empathy; enhancing interpersonal and social skills; assisting with value clarifications; clarifying cognitive distortions; teaching to recognise internal and external antecedents of sexual offending. They also recommend limiting the use of antiandrogens to the most severe cases and discourage their use with youths under the age of 17.

Långström et al. (2013) have conducted a systematic review of one randomised controlled trial (using MST) and prospective controlled observational studies of adolescent perpetrators of adolescent or child sexual abuse. They concluded that only MST could be effective in preventing sexual reoffending among moderate risk adolescent sexual offenders (relative risk 0.18; CI: 0.04–0.73). One limitation is that the effectiveness of this therapy seems to be reduced, when it is implemented by non-researchers outside the settings in which it was originally developed (Curtis et al. 2004; Littell et al. 2005: Cochrane Syst Rev.). The scientific evidence was insufficient for CBT effectiveness in preventing sexual reoffending among moderate risk adolescent sexual offenders and no evidence was found in high-risk subjects. For children under the age of 13 who abuse other children (which is beyond the scope of our guidelines), there was only one high quality randomised



controlled trial using a combination of CBT and parental support as compared to standard treatment (group based play therapy combined with parental support) with insufficient level of evidence, and no evidence for other preventive interventions.

In the same way, in the meta-analysis conducted by Reitzel and Carbonell (2006), the average weighted effect size concerning the effectiveness of juvenile sexual offenders treatment (any kind) was 0.43 (2,986 subjects; nine studies; CI: 0.33–0.55;  $p < 0.001$ ), which means that for every 43 sexual offenders receiving the primary treatment who recidivated, 100 of the sexual offenders in the comparison group or in the no-treatment group recidivated. The best treatment effect sizes were found in studies with the highest baseline rates of recidivism (i.e., multisystemic studies) but studies using MST were also the best-designed studies.

In another meta-analysis, Walker et al. (2004) reported encouraging effects, especially in the studies utilising CBT approaches to treat male adolescent sexual offenders. Ten studies ( $n=644$ ) were included in their review (two controlled and eight uncontrolled studies). The overall average weighted effect size ( $r$ ) was 0.37. In three studies using an outcome measure of sexual recidivism, the weighted average  $r$  was 0.26. Although this result is somewhat encouraging, one cannot conclude that treatment necessarily reduces the risk of recidivism, as only three of the 10 studies in this meta-analysis used recidivism as an outcome variable. In fact, effect size calculations were based on a blend of dependent variables including psychological test scores, measurements of sexual arousal, and recidivism rates. Furthermore, only two of the 10 studies included in this meta-analysis employed a comparison group. Finally, the interesting notation is that three of the four studies with effect sizes above 0.50 employed CBT or MST.

Fortune and Lambie (2006) summarised 28 published studies of specialised treatment. They found that only seven of the studies included a comparison group, and only five investigations employed a mean follow-up period beyond 5 years. They concluded that, although recidivism rates for treated youths are typically lower than recidivism rates for those who did not receive treatment, methodological problems make it difficult to draw conclusions regarding the outcome of specialised treatments.

Finally, Gerardin and Thibaut (2004) have reviewed studies of specialised treatments for adolescent sexual offenders and recidivism rates published between 1986 and 2000. Among 12 studies, only three had comparison groups (in one study there was no information on treatment received). CBT was used in 10 studies, MST in

one study and “Sexual abuse, family education and treatment programme” (SAFE-T) in another study. Follow-up durations were from several weeks to 10 years. Recidivism outcome measures used were criminal charges, convictions or re-arrests (7/12 studies), penile plethysmography in one study and self-reports in other cases. Sexual recidivism rates were from 0 to 18% in the treatment groups as compared to 19 or 75% in the comparison groups (respectively observed in the comparison groups of Worling and Curwen 2000 and Borduin et al. 1990). They concluded that treatment must include behavioural therapy as well as family therapy and psychosocial interventions; psychiatric interventions may be indicated to manage concurrent psychiatric diseases. Pharmacotherapy cannot be a first-line treatment: SSRIs can be effective but controlled studies are necessary; in some rare situations with severe paraphilias associated with a high risk of sexual violence, hormonal interventions may be needed, subject to informed consent of the youths and their parents.

### Evaluation of a paraphilic disorder

Juvenile sexual offenders are a heterogeneous group and standardised methods of assessment including risk assessment tools would probably help to facilitate treatment strategies. Such methods would include the assessment of intellectual and personality functioning or psychopathology and the assessment of sexual behaviour and minimisation or denial of the sex offence. Gathering multiple sources of information is crucial (family interviewing, getting information from teachers and peers is also important).

Motivational interviewing is not mentioned in the published studies but lack of motivation is a major factor of non-compliance and it should be routinely assessed.

Clinical and demographic characteristics include:

- demographic characteristics of the subject: age, gender, number of siblings (age and gender if any), education level, school adjustment and performances;
- deviant and non-deviant sexual fantasies and activity (frequency and type), exclusive or non-exclusive paraphilic disorder behaviour, age at onset of paraphilic disorder behaviour and fantasies, type and number of paraphilic disorders, gender and age of victims, intra-familial or not (known or unknown victim), internet use or video use, violence, previous convictions for sexual or non-sexual offences, family and personal history of sexual disorders, previous treatments for sexual offending and compliance, alcohol or illicit drug consumption, age of puberty, completion of growth, etc.;



- family background and functioning as well as peer relationships;
- family and personal history of psychiatric disorders or suicide attempts, history of brain trauma, previous or current psychiatric or non-psychiatric diseases, treatments and compliance, previous history of sexual or physical abuse, personality disorders, etc.;
- empathy, coping with stress, impulsivity, interpersonal relationships, insight, motivation for treatment, cognitive distortions, denial, degree of mental retardation if any, etc.

The first step is to establish a trusting relationship with the adolescent. Saunders and Awad (1988) recommended having different sequences of questions to determine offenders' knowledge about biological gender differences and sexual intercourses. They also suggested inquiring about understanding and experiences of normal and deviant sexual activities and experience of sexual abuse. A psychiatric interview is necessary to identify and address environment stressors and potentially treatable neuropsychiatric conditions, which may contribute to the aggressive and deviant behaviour. A medical examination is also necessary which should focus on endocrinological and neurological status. Cognitive performance has also to be measured (evaluation of specific learning or language disorders; executive dysfunctions may be assessed if necessary) (Gerardin and Thibaut, 2004). Standardised assessment scales are interesting to evaluate potential risk of reoffending (ERASOR and J-SOAP-II are the most frequently used in North America, McGrath et al. 2009). The use of direct measurement of sexual arousal using phallometric assessment is not recommended in adolescent sex offenders. Visual Reaction time may be used as a less intrusive objective measure of sexual preference (see also previous chapter on outcome measures).

The aims of the baseline evaluation are to obtain:

- diagnosis and evaluation of the severity of paraphilic disorder(s);
- evaluation of comorbidities with personality disorders or psychiatric disorders (especially attention deficit/hyperactivity disorders (ADHD), affective disorders, addictive disorders, conduct disorders, anxiety disorders, obsessive-compulsive disorders and psychotic disorders) including assessment of suicidality, decision for treatment or referral;
- a neuropsychological evaluation;
- an evaluation of intellectual capacity (IQ) (limits to insight, self-control and CBT efficacy);
- status of legal responsibility, including factors of age (regulations differ by country) and IQ;
- assessment of treatment motivation and capacity/need of support for treatment compliance;
- assessment of recidivism risk, including history of records in education (discipline)/police/justice systems;
- information on comorbidity with somatic diseases if any, assessment of need for treatment referral;
- evaluation of the youth's psychosocial environment (social support and/or risk systems including family and peers, educational status, estimate of crime rate in neighbourhood (role model) and of access to weapons and, last but not least, barriers to health care providers including lack of social security).

**Antiandrogens or GnRHa (when necessary, see Table IV) have to be prescribed by a physician specialised in paediatric endocrinology, after appropriate medical assessment including:**

- physical examination, weight, height and body mass index (BMI) by age and gender percentiles, target height (Almeida et al. 2008), blood pressure measurements and electrocardiogram; testosterone, testosterone-binding protein, LH, prolactin blood levels; hepatocellular, kidney and thyroid function evaluations; fasting blood glucose levels; lipid profile; calcium and phosphate blood levels (Eibs et al. 1982a; Eibs et al. 1982b);
- previous history/risk of thromboembolism including smoking during therapy (e.g., acne, contraception, hirsutism, polycystic ovary syndrome, pubertas praecox/tarda) (CPA or MPA), gynaecomastia (Ahmadi and Daneshmend 2013), pituitary adenoma (Huygh et al. 2015), meningioma (Gil et al. 2011), hepatic disease (CPA), liver carcinoma (CPA), severe osteoporosis, tuberculosis (CPA), diabetes (CPA or MPA), cachexia (CPA), severe chronic depressive disorder including assessment of suicidality, as well as allergy to hormonal treatment must be assessed through interview of each candidate for hormonal treatment;
- finally, in case of personal or familial osteoporosis risk, baseline bone mineral density must be checked by using osteodensitometry but avoid unnecessary X-ray exposure;
- in case of any concomitant medical condition check for possible pathophysiological, metabolic or drug-drug interaction patterns; including hormone-producing tumours as well as drug-induced hypersexuality, agitation or impulsivity.
- informed consent from parents (or legal guardian) and patient must be obtained.

Table IV. Algorithm of pharmacological treatment of adolescent sexual offenders with paraphilic disorders.

Treatment	Pharmacological treatments	Psychological treatments
<b>Level 1</b> Sexual offenders with paraphilic disorders without violence Age 12 or more	None	Indicated in all cases as a first-line treatment <b>Types of psychological treatments:</b> Motivational interviewing to prevent treatment drop outs ( <b>Level D</b> )
<b>Level 2</b> Adolescent “hands off” or “hands on” sexual offender with low or moderate levels of violence (e.g., indecent exposure, touching the body or genital parts of another person)	<b>SSRIs:</b> increase the dosage at the same level as prescribed in OCD (e.g., fluoxetine (up to 40 mg/day) or sertraline (100–150 mg/day)) (depending on age) ( <b>Level D</b> )	–Multisystemic treatment (MST) ( <b>Level C</b> ) –Cognitive behaviour therapy (CBT) ( <b>Level C</b> ) –Psycho-social-educational interventions (at least if both previous therapies are not available) ( <b>Level D</b> )
<b>Level 3</b> Adolescent sexual offender with high risk of violent sexual offending behaviour (e.g., associated with coercive sexual sadism in fantasies and/or behaviour) Tanner stage V required	Add <b>antiandrogens</b> at the lowest effective dosage and check every 6 months the need for anti-androgen treatment ( <b>Level D</b> ) Depending on the risk of sexual violence: first step: SSRI's plus a low dose of antiandrogen (e.g., cyproterone acetate 50 mg/day) second step (if no success with step 1 or very high risk): Cyproterone acetate: 100–200 mg/day or Medroxyprogesterone acetate: 50–300 mg/day if CPA is not available or Long acting GnRH agonists, e.g., triptoreline or leuprolide acetate: 3 mg/month or 11.25 mg i.m. every 3 months (cyproterone acetate may be associated with GnRH agonist treatment one week before and during the first month of GNRHa to prevent a flare-up effect and to control the relapse risk of deviant sexual behaviour which may be associated to the flare-up effect)	Treatment preferably delivered in peer group settings Community treatment, or residential if indicated
<b>Level 4</b> Same as level 3, but age 17 or older Tanner stage V required	Same as level 3, but no time limit for antiandrogen treatment ( <b>Level C for adults</b> )	

SSRIs, selective serotonin reuptake inhibitors; GnRHa, gonadotrophin-releasing-hormone agonists.

Level of evidence (C, D) (see definitions in the previous chapter: Methods of our analysis).

Definition of Tanner stage: see Annexe 1.

Description of the psychological approaches, refer to previous chapter on psychological treatments.

## Monitoring of the patient

Deviant and non-deviant sexual activity and fantasies (nature, intensity and frequency) and risk of sex offence must be evaluated during the interview at least every month through self-reports of the patient and, if useful and possible, interview of parents and/or caregivers.

In case of hormonal treatment, due to ongoing development of the adolescent, monitor more frequently than in adults:

- every 3 months, blood pressure, height/weight/BMI percentiles, gynaecomastia;
- every 3 months, fasting blood glucose levels, lipid profile, renal function, thromboembolic indicators, calcium and phosphate levels, (plus blood cell counts, hepatocellular functions if CPA is used);
- every 3 months, testosterone blood levels to monitor changes due to ongoing development, breaks in

the therapy, or in case of risk of masked testosterone supplementation;

- every 2 years (or every year, if increased risk of osteoporosis), bone mineral density could be checked using osteodensitometry, consult with a paediatrician to avoid unnecessary X-ray exposure. Calcium, vitamin D or biphosphonates must be prescribed in case of osteoporosis as adolescents too may be exposed to osteoporosis.

## Treatment guidelines/algorithm of pharmacological treatment (Table IV)

### General principles

The paediatrician or the general practitioner, during the course of a routine evaluation, plays an important role for children, adolescents and their families in education about normal sexual development, and sometimes in

early recognition of deviant sexual behaviour. Health professionals must know that not all sexual contacts between minors are harmless and they must learn to identify juvenile deviant sexual behaviour. In case of non-consent, coercion or a significant age difference, sexually abusive behaviour must be recognised and reported to the authorities.

Trauma models posit that being neglected or sexually-abused as a child is a major explanatory factor as to why some sexual abusers commit their offences, in particular adolescent sexual offenders. Accordingly, helping abusers resolve their sexual trauma is considered a critical treatment component in this population.

Preventing sexual trauma through media campaigns and school programmes (education of parents, teachers and youths) is also very helpful as well as creating a free hotline for people who want to anonymously seek help for their deviant sexual fantasies (as implemented in Germany) (Thibaut 2015).

Juveniles who display psychiatric and behavioural problems may require additional therapies. In these cases, pharmacological treatments such as benzodiazepines, antipsychotics, antidepressants or other specific psychotherapies must be used according to prescription recommendations. In particular, some sexual abusers are viewed as having a sexual addiction and may require specific psychotherapies (for review of these therapies, see Garcia and Thibaut 2010, Assumpção et al. 2015).

Treatment in adolescents should follow the principles of the Risk Need Responsivity model developed by Andrews and Bonta (2010). These authors suggested that an effective therapy has to focus on the risk of a single offender for committing new offences. The higher the risk, the more intensive the intervention should be. Specific criminogenic needs, like sexual deviance, should be considered in therapy-goals as well as responsivity factors like intellectual dysfunction.

Behaviour therapy is founded on the premise that behaviour is learned and that it can be changed by a variety of methods. The family is the primary unit of treatment and the goal of family therapy is to change maladaptive relationship patterns. In addition, education (especially sexual education) may help sexual abusers to change their behaviour. In adolescents with paraphilic disorders, CBT or MST approaches should always be used as first-line treatments. Accordingly, pharmacological interventions, when necessary, should always be part of a more comprehensive treatment plan including psychological therapies. There are no licenced medications for the treatment of adolescent sexual offenders, either in Europe or in North America. In general, the treatment approaches recommended for these age

groups are CBT interventions, family interventions, psycho-educational interventions and, in some cases, SSRIs. The use of antiandrogens is discouraged before 17 years of age. Research showed that they can delay onset of puberty and bone growth.

It is difficult to recommend a length of follow-up as only scarce long-term studies with large samples have been conducted on adolescent sex offenders. In the same way, the duration of the therapies reported in the published studies were very heterogeneous and it is difficult to recommend a minimal duration of psychological or pharmacological treatment.

Group CBT and MST have usually been described as treatments of choice, but well-designed comparative studies, conducted on large samples, are still lacking. If multisystemic approach (MST) appears the most efficient, proper systemic family therapy is not always feasible and, in this case, any kind of family intervention could be appropriate. The first step of treatment is motivation and engagement in treatment. The next step is to help the juvenile to accept the responsibility for his behaviour, which does not necessarily mean admittance of an offence. Other treatment objectives are: improvement of cognitive distortions, reduction of deviant arousal and atypical sexual interests, enhancement of impulse control and control of anger, improvement of victim empathy, knowledge of warning signals leading to offending and, of course, sexual education. Patients must also be helped with the acquisition of communication skills and social competency. Substance abuse and antisocial behaviour are also important treatment targets if present.

In accordance with Andrews and Bonta's responsivity principles, treatment programmes for mentally-retarded sexual offenders should be more concrete, practical, and action-oriented, with cognitive demand minimised (Lindsay et al. 1999).

Services are often provided in the home, neighbourhood, school, and community in an effort to change the individual's "ecological context". Home visits by social workers or psychologists, after discharge from residential treatment or during ambulatory therapies, may be interesting complements. This emphasises the importance of a multi-professional team including mental health professionals such as psychiatrists, psychologists, social workers etc. The involvement of parents and caregivers is also important as well as coordination with teachers and school health professionals.

Community-based treatment may be proposed when the offence is the first one, when there is no history of violence, antisocial behaviour or psychiatric illness and when the patient accepts treatment. Residential treatment may be preferred when adolescents'

maladjustment is severe and when family environment is inadequate (Gerardin and Thibaut, 2004).

Pharmacological treatment should also follow the principles of the Risk Need Responsivity model, meaning that the higher the risk, the more intensive the proposed effects of medication should be. The criminogenic needs primarily addressed by medication are: sexual deviance/paraphilia and hypersexuality/sexual preoccupations.

### Algorithm

Adolescent sex offenders with a paraphilic disorder need to be considered broadly into two groups based on age ( $>18$  and  $\leq 18$ ) and, by implication, stage of puberty (according to Tanner stages of puberty, Tanner 1973) (Annexe 1). The mean age of onset of puberty in boys is 11.6 years (range 9.5–13.5 years).

For subjects older than 18, please refer to our previous guidelines (Thibaut et al. 2010; [www.wfsbp.org](http://www.wfsbp.org) for free download). Adolescents older than 18 years old should go through the same evaluation of severity as that proposed in the WFSBP adult guidelines and clinicians are advised to follow the guidelines for treatment of adult paraphilic subjects if pharmacological treatment is necessary in addition to psychological therapies (Thibaut et al. 2010; [www.wfsbp.org](http://www.wfsbp.org) for free download).

The other group (12–18 years of age) may be divided into two subgroups:

- Group I, between 12 and 16 years of age ( $\leq 16$  years),
- Group II, from 17 to 18 years of age ( $>16$  years).

The first group would still be in an active developmental stage of puberty (between Tanner III and V), whereas the group 17–18 years of age is most likely having completed puberty in the majority of cases (Tanner V stage of puberty). As part of the evaluation, and prior to pharmacological treatment (especially antiandrogens), assessment of the stage of puberty needs to be completed through hormonal levels and X-ray of the long bones looking at epiphyseal closure; consultation with a paediatric expert in endocrinology of adolescents is necessary in case of any doubt about completion of puberty and of bone growth (see also Annexe 1).

The treatment algorithms for the two groups are different (Table IV).

We also have to take into account the fact that the US Food and Drug Administration (FDA) released safety warnings, stating that use of antidepressants may increase the risk of suicidality in children, adolescents

and young adults up to age 24 years (<http://www.fda.gov/Drugs/DrugSafety/InformationbyDrugClass/UCM096273>).

Therefore, in adolescents and young adults, initiation of antidepressant treatment may precipitate short-term increases in suicidal ideation and behaviour (Simon 2006). Clinicians and the public are urged to weigh the risk of using antidepressants in youths versus the risk of not treating paraphilic juveniles at-risk of sexual offending.

**Group I** (between 12 and 16 years of age) ( $\leq 16$  years) (Table IV):

The treatments recommended for these age groups are MST, CBT, family interventions (Level C of evidence) and (at least if both previous therapies are not available) psycho-educational interventions including sexual education (Level D). Motivational interviewing is also recommended to prevent treatment drop outs (Level D). From a pharmacological standpoint and, as a second step, SSRIs are the most common form of pharmacological treatment prescribed in this population, in the dosage ranges recommended in the WFSBP algorithm (see Table IV) (Level D of evidence with few case reports). If stage Tanner V of puberty is not reached (especially if bone growth is not completed), antiandrogen treatment must not be used, even in severe cases.

**Group 2** (17 to 18 years of age; Tanner stage V of puberty) ( $>16$  years):

Psychological treatments must always be used as first-line treatments. In adolescents with paraphilic disorders, MST or CBT approaches should be used. Pharmacological interventions, when necessary, should always be part of a more comprehensive treatment plan including psychological therapies.

If Tanner V stage of puberty is reached and age above 17, adolescents should go through the same evaluation of severity as that proposed in the WFSBP adult guidelines and clinicians are advised to follow the guidelines for treatment of adult paraphilic subjects if pharmacological treatment is necessary in addition to psychological therapies (Thibaut et al. 2010).

In case of Tanner stage IV or below, in the most severe cases, growth must be assessed (using X-ray of the long bones looking at epiphyseal closure) before antiandrogen treatment is prescribed and the advice of an expert in paediatric endocrinology is necessary. The levels of evidence for these treatments are Level C/D for MST and CBT (Level C was shown for moderate risk subjects but was not clear for high risk subjects), Level D for SSRIs and Level D for a combination of SSRIs and an antiandrogen, or an antiandrogen used alone (few case reports).

If growth is not completed see above Group 1 recommendations (between 12 and 16 years of age).



The question of the length of treatment needs to be constantly evaluated.

Informed consent must be obtained from the youth, his parents and/or caregivers in all cases of antiandrogen treatment prescription, according to the national legal and ethical regulations.

Taking into account the low level of evidence available in the literature on which we have based our guidelines, clinicians who will use these guidelines are strongly encouraged to send us their comments and feedback (to the corresponding author of this paper) in order to help us to improve these guidelines in the future.

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## Annexe 1 (Tanner 1973)

Because the onset and progression of puberty are so variable, Tanner has proposed a scale, now uniformly accepted, to describe the onset and progression of pubertal changes. Boys are rated on a five-point scale. Boys are rated for genital development and pubic hair growth. The same may apply for girls but there is no indication of antiandrogen treatment in female adolescents.

The mean age of onset of puberty is 11.6 years in boys (range 9.5–13.5 years). Progression from Tanner stage II to V takes 2–4 years. The first physical sign of puberty is testicular enlargement in 98% of males.

## The stages in male pubic hair development are as follows

Stage I: Prepubertal (can see velus hair over the pubes similar to abdominal wall). There is no androgen-sensitive pubic hair.

Stage II: Sparse growth of long pigmented downy hair, slightly straight or curled, at base of penis.

Stage III: Darker, coarser and more curled hair, spreading sparsely over junction of pubes (easy to recognise).

Stage IV: Hair adult in type, but covering smaller area than in adult; no spread to medial surface of thighs.

Stage V: Adult distribution in type and quantity, described in the inverse triangle. There can be spread to the medial surface of the thighs.

## The stages for male genitalia development are as follows

Stage I: The testes, scrotal sac, and penis have a size and proportion similar to those seen in early childhood.

Stage II: Enlargement of scrotum and testes; scrotum skin reddens and changes in texture.

Stage III: Enlargement of penis (length at first, although with some increase in circumference); further growth of testes and scrotum.

Stage IV: Increased size of penis with growth in length and circumference and development of glans penis; testes and scrotum become larger and scrotum skin darker.

Stage V: Adult genitalia, testes volume >20 ml.

## Boys growth

Stage I: 5–6 cm/year.

Stage II: 5–6 cm/year.

Stage III: 7–8 cm/year.

Stage IV: 10 cm/year.

Stage V: No further height increase after 17 years.

Based on a radiological examination of skeletal development of the left-hand wrist, bone age is assessed and then compared with the chronological age. The main clinical methods for skeletal bone age evaluation are the Greulich and Pyle (GP) method and the Tanner and Whitehouse (TW2) method. Both methods rely on radiographs taken from the left hand. Their respective use depends on the countries.