Paraphilia and Paraphilic Disorders

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18.1 Introduction

Throughout human history, the term perversion has been used to indicate an aberration or a deviation from norm, based on moral, theological, and juridical principles. During the nineteenth century, much attention was centered on the study of perversions and the causes that originate them, finding a connection between sexual desire and sexual instinct, thought of as a reproductive instinct. Perversions were so considered as functional diseases of this same instinct and, in particular, as though characterized by a deviation of this compulsion from its natural purpose.

In the very famous *Psychopathia Sexualis*, Krafft-Ebing (a German neurologist and psychiatrist) proposed once again the idea of perversion as a functional deviation of sexual instinct, sustaining that these perversions should be considered part of an individual's personality in a psychological level [1]. So, if the term perverse was once utilized to describe individuals that turned themselves toward "evil," Krafft-Ebing changed this preconceived idea when defining perversions as different ways of being a person, paying particular attention to the differences between simple immorality and criminal sexual offenses. After that, Freud [2] characterized children's sexuality as

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being perverse, saying it's composed of a series of partial sexual instincts, every one of which originates in one of the very erogenous zones of a child's body, pursuing its finalities. He explained the pathological mechanism that conducts toward said perversions as a combination of fixation in one of the psychosexual phases of development during the first 5 or 6 years of life and a regression of said fixation in the beginning of puberty. Freud then continued by considering fixation a direct result of the denial of a traumatic sexual experience, in particular of the castration anxiety that accompanies a child's oedipal desire. He, in fact, sustained that every perversion should be interpreted as an attempt of reassurance and defense against castration anxiety. Freud even coined the term by combining the Greek words for "along the side" (para) and "love" (philia). Then it was Kinsey [3] who demonstrated, in his statistical reports on human sexual behavior, that most of these so-called perversions weren't necessarily pathological. In particular, he revealed that many deviant sexual practices were in fact quite common in the American population, and since many perversions could be also found among animals, Kinsey affirmed that there was no sense in considering said perversions a violation of natural norms. According to Aggrawal, who published in 2008 one of the most complete lists of paraphilias with hundreds of descriptions [4], because sexual arousal may arise from any type of human experience, unusual sexual attractions that are sometimes so harmless don't arrive to the clinicians' attention and consequently may remain unknown. Table 18.1 lists the most common paraphilias [4, 5].

In current times, it is quite obvious that paraphilias are conditions characterized by atypical sexual interests that can affect individuals of all kinds of orientations and even different gender identities. There are no more prejudices against homosexuality or transsexuality, which were once thought as the bases of various deviant sexual behaviors. In this same way of thinking and differently from the fourth edition [6], the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) doesn't consider paraphilia per se a mental disorder [7]. Only the actual experiencing of distress referred to by the patient and/or a possible damage to other people completes the diagnosis of a paraphilic disorder. A paraphilic disorder is in fact a paraphilia that causes distress or compromises the sexual functioning of the individual or a paraphilia whose fulfillment implicates personal damage or risk of damage to others [8]. Also the 11th revision of the *International Classification of Diseases for Mortality and Morbidity Statistics* (ICD-11), which will be officially published by the World Health Organization (WHO) during 2018 [9], is in line with the changes on paraphilia that appeared in DSM-5. In fact, whereas in Chapter V "Mental and Behavioral Disorders" of the 10th revision of *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) [10] paraphilias are classified as "Disorders of sexual preference" in the group of "Disorders of adult personality and behavior" [11], in Sect. 18.6 "Mental, Behavioural or Neurodevelopmental Disorders" of ICD-11, paraphilias are classified as "paraphilic disorders" and are emphasized for the diagnosis to have the presence of the marked subjective distress generated by atypical sexual thinking, desires, and conducts [12].

Paraphilia, one of the most misunderstood categories of diagnosis in psychiatry, is frequently associated with sexual offense; the two concepts do not necessarily go hand in hand. Sometimes the sexual offense may be directed toward people affected by disabilities [13, 14].

Table 18.1 Description of most common paraphilias [4, 5]

Paraphilia classification		Description
Paraphilias of act		
Visual	Exhibitionism	Arousal from exposing genitals in public; rare in females
	Voyeurism	Sexual arousal achieved by watching sexual acts (e.g., coitus or naked person)
	Icolagnia	Arousal from contemplation of, or contact with, sculptures or pictures; a form of voyeurism
	Candaulism	Sexual practice or fantasy in which a man (usually) exposes his female partner, or images of her, to other people for their voyeuristic pleasure
	Sadism	Sexual arousal resulting from causing mental or physical suffering to another person
	Capnolagnia	Arousal from watching others smoke
Acoustic	Mixacusi	Sexual arousal resulting from listening in on couples engaged in sexual intercourse
	Pornolalia	Sexual arousal results from the use of naughty/vulgar words during coitus
	Sadism	Sexual arousal resulting from causing mental or physical suffering to another person
Olfactory	Coprolagnia	The thought, sight, or smell of excrement causing pleasurable sexual sensation
	Urophilia	Sexual arousal achieved from smelling urine (usually urinating on one's partner)
	Osphresiolagnia	Erotic excitement produced by odors; an inordinate love of smells
	Mysophilia	Sexual pleasure resulting from interaction with dirt or garbage or in general getting sexually aroused by a dirty/filthy person or object
	Sadism	Sexual arousal resulting from causing mental or physical suffering to another person
Gustatory	Coprourofagia	Sexual arousal results from eating/drinking feces and urine
	Picacism	Sexual pleasure resulting from eating body parts (e.g., nails, hair, sperm, etc.)
	Dermatofagia	Sexual pleasure deriving from eating parts of the skin
	Vampirism	Seeing, feeling, or ingesting blood while having the illusion of being a vampire
	Cannibalism	Sexual pleasure achieved by eating human flesh
	Sadism	Sexual arousal resulting from causing mental or physical suffering to another person
	Lactofilia	Sexual arousal derives from observing a woman while nursing a child or more specifically from being nursed by the woman (ingesting a woman's milk during the lactation period)

(continued)

Table 18.1 (continued)

Paraphilia classification		Description
Tactile	Frotteurism	Rubbing genitalia against strangers to achieve sexual arousal/pleasure
	Copro-/urolagnia	Arousal from feces/urine or being defecated/urinated on
	Mysophilia	Sexual pleasure resulting from interaction with dirt or garbage or generally getting sexually aroused by dirty/filthy people or objects
	Automasochism	Inflicting intense pain on one's own body; different from masochism in which a partner inflicts pain. Also sometimes referred to as autosadism
	Masochism	Sexual pleasure derived from being abused mentally or physically or from being humiliated by another person
	Sadomasochism	Giving or receiving sexual pleasure from acts involving the receipt or infliction of pain or humiliation
	Sadism	Sexual arousal resulting from causing mental or physical suffering to another person
Of incorporation	Catheterophilia	Arousal from use of catheters
	Klismaphilia	Sexual arousal is achieved in receiving or administering enemas (or both)
	Impalement	Sexual arousal is achieved by being impaled or impaling others
	Injection-mania	Sexual arousal derives from injections (being injected or injecting others)
Paraphilias of object		
Age	Pedophilia	Sexual activity with prepubescent children; most common paraphilia
	Gerontophilia	Arousal from a partner from an older generation
Parentage	Incest	Sexual activity between family members or close relatives
	Narcissism	Sexual arousal results from watching oneself or images of one's self
Species	Zoophilia/bestiality	Sexual intercourse with animals
	Zoorape	Sexual pleasure achieved through the rape of animals
	Necrozoophilia/necrobestiality	Arousal from having sex with dead animals
	Dendrophilia	Sexually attracted to/sexually aroused by trees
Vitality	Iconolagny	Arousal from pictures or statues of nude people
	Necrophilia	Sexual pleasure deriving from intercourse with corpses
	Necrosadism	Arousal from mutilating a corpse
	Sexual homicide	Arousal is achieved by killing the victim with the only purpose of sexual pleasure/intercourse
Imagination	Spectrophilia	Sexual attraction to ghosts or sexual arousal from images in mirrors, as well as the phenomenon of sexual encounters between ghosts and humans
	Demonphilia	Sexual attraction for demons
	Religious possession	Sexual fantasies of religious nature (e.g., sexual intercourse with angels, saints, etc.)
Fetishism	All of the above	Sexual arousal with inanimate objects or part(s) of a person's body

Actually, many people that commit a sexual offense do not meet the criteria for a sexual paraphilia, and likewise, people diagnosed with a paraphilia may never have committed a sexual crime.

Paraphilias are deviant sexual behaviors characterized by experiencing, over a period of at least 6 months, "recurrent, intense sexually arousing fantasies, sexual urges, or behaviors" that mostly involve inhuman objects or non-consenting partners. To be able to make a paraphilia diagnosis, a necessary criterion is that the person must have actually acted on these urges or is at least remarkably distressed by them. Some people may have only had the urges or the fantasies of a paraphilia but have never acted upon them.

18.2 The Specific Paraphilias

18.2.1 Criminal Sex Offending Behaviors

18.2.1.1 Exhibitionism

Exhibitionism generally involves men displaying their genitalia to unsuspecting strangers so that they will be shocked or (in the paraphilic's fantasy) sexually interested. There may or may not be masturbation involved during or immediately following the act. In later years, the exhibition of your own body and genitalia has seen a significant increase thanks to the new technologies and social networks, giving life to the much-discussed phenomenon of cybersex and sexting. In this context exhibitionism as a deviant behavior is classified as a paraphilia when it involves non-consenting spectators. The diagnosis is not usually made when a man is arrested for "public indecency" and his penile exposures are motivated to arrange homosexual contact in a public place generally unseen by heterosexuals (penile display in parks is one way to make anonymous contact). In the latest version of the DSM, a distinction is made between exhibitionism and exhibitionist disorder; exhibitionism is about fantasies, impulses, and/or behaviors that have as a principal purpose the exposure of genitalia to an unsuspecting stranger. This generally doesn't provoke a significant discomfort to the subject and is expression of a non-pathological sexual preference. In case of the exhibitionistic disorder, these same fantasies, impulses, and/or behaviors provoke, for a period of at least 6 months, a clinically significant discomfort in one or more functional areas (familiar, social, occupational, etc.). Even in the absence of discomfort, the clinician is obliged to make a diagnosis of exhibitionistic disorder in case the subject has acted on his impulses with three different non-consenting persons in different occasions. This phenomenon is characterized by an early onset (generally before 18), by a process of selection of the victim (usually of the opposite sex) and from the acting on sexual autoerotic behavior and in situations that there is always the risk of being found out. The intent of this behavior is to generate reactions of surprise, fear, and embarrassment. Being seen and the victim's reaction are what are deemed as exciting by the paraphilic. The unsuspecting stranger represents the spectator/witness necessary for the exhibitionist to enact his fantasy. This is generally associated with masturbation, and usually there is no intention of making any physical contact with the victim.

18.2.1.2 Pedophilia

The etymology of the term pedophilia originates from Greek, παις pais (child/boy) and φιλι′α philia (love), and signifies love for children/boys. This love doesn't have a sexual prerogative, differently from the word pederastia, a combination of the words pais ed. érastes (lover), whose etymological root derives from the word Eros and stands for a sexualized love. In the general public's eye and in the clinical language, the word pedophile stands for an adult that shows erotic/sexual attraction toward prepubescent children, even though it doesn't exactly correspond to the etymological definition.

Pedophilia is the most socially repudiated of the paraphilias. Pedophiles are usually men who sexually prefer children or prepubescent adolescents. They are grouped into categories depending upon their erotic preferences for boys or girls and for infant, young, or pubertal children. Society thinks of a pedophile as a person who sexually targets a minor and therefore prosecutes under this term adults who target adolescents. Some pedophiles have highly age- and sex-specific tastes; others are less discriminating.

Even though there have been some changes in the definition from an edition to another, the DSM and the ICD have always classified pedophilia in the lists of mental and sexual disorders. Psychiatry has in this way always confirmed the pathological nature of this behavior, because an individual that has surpassed puberty can't desire a sexual relationship with a prepubescent child since their sensualities result as being incompatible. For this reason, no society, no culture, or even period can ever declassify it from being a pathological condition. It's also fundamental that pedophilia should not be confused with or be considered synonymous with child abuse. The diagnosis of any paraphilia including pedophilia requires recurrent, intense sexually arousing fantasies, sexual urges, or behaviors involving sexual activity with a prepubescent child or children over a period of at least 6 months, so the disorder should not be expected to be present in every person who is guilty of child molestation. Some cases of child abuse can occur over a shorter time interval and result from the combination of several factors like deteriorated marriages, sexual deprivation, sociopathy, and substance abuse. Child molestation, whether paraphilic or not, is a crime, however.

18.2.1.3 Voyeurism

Although the act of being sexually aroused by watching erotic scenes is becoming more diffused and accepted, voyeurism is recognized as a paraphilia when it involves unsuspecting people. In the latest version of the DSM, this paraphilia is classified, together with exhibitionism and frotteurism, in the courtship disorders, since it's usual in love advances to touch or look at a lover's body to experience pleasure or even show your own nudity for your lover's pleasure, even though this happens in a consensual relationship between adults. The fifth edition of the DSM distinguishes voyeurism as an expression of a sexual preference that is not necessarily pathological. It is described as a condition of recurrent and intense sexual arousal manifested through fantasies, desires, and/or behaviors that derive from observing unsuspecting people naked, during the act of getting naked, or engaged in sexual activities. This situation doesn't involve discomfort for the subject who experiences it and so is not necessarily in need of a clinical intervention. In the voyeuristic disorder, these fantasies and behaviors cause a significant clinical discomfort or a

dysfunction of social and occupational areas for a period of at least 6 months. Another element that directs the clinician toward the diagnosis of a voyeuristic disorder is a behavior that is damaging to other unsuspecting people while they're naked, engaged in sexual intercourse, etc.

Voyeurism circles around the concept of "power unbalancing": the paraphilic exercises an indirect control over the stranger; the unsuspecting victim goes through his/her intimate activities while spied by the peeping tom, who gets on a higher power level through "watching without being seen." Men whose sexual life consists of watching homosexual or heterosexual videos in sexual bookstores occasionally come to psychiatric attention after being charged with a crime following a police raid. The voyeurs who are more problematic for society are those who watch women through windows or break into their dwellings for this purpose. Some of these crimes result in rape or nonsexual violence, but many are motivated by pure voyeuristic intent (which is subtly aggressive).

18.2.1.4 Sexual Sadism

According to the latest version of the DSM, to make a diagnosis of sexual sadism disorder, the presence of intense and recurrent sexual arousal that manifests itself through fantasies, desires, or behaviors closely connected to the physical or psychological sufferance of another person is necessary. The individual has to also take act of these fantasies on another non-consenting person, or in alternative, these sexual desires or fantasies need to cause a significant clinical discomfort or a functional impairment in a social or occupational sphere.

While rape may occur in extreme cases of sadism, paraphilic sadism is correlated with only a minority of rape cases. It usually happens in cases where the rapist uses prior erotic scripts that involve a partner's fear, pain, humiliation, and suffering. Rapists, whether paraphilic or not, are dangerous men who show antisocial behaviors that make them generally unresponsive to psychiatric treatments. Most commonly sexual sadism is found among individuals who enjoy sadomasochistic sexual practices, unrelated to them enjoying either the dominant or the submissive role or even exclusively like to be controlling and pain or fear inducing. Many murderers (have long been recognized) have a need to torture their victims prior to killing them, showing thus a sadistic nature.

18.2.1.5 Frotteurism

Frotteurism is a sexual paraphilic behavior that an individual, usually male, experiences through a strong and intense compulsion where they feel the need to touch and rub against non-consenting persons. From the clinical description that Krafft-Ebing made in 1862 [1] until today, frotteurism has been classified in at least three categories: frottage, toucherism, and grabbage. Individuals that prefer to rub their genitals (covered) on the body of an unsuspecting victim are classified in frottage, others that prefer to rub parts of their own body on the body of an unknown unsuspecting victim are classified in toucherism, and those that act "attacking" a person from behind and grabbing parts of their body usually associated with intimacy (breasts-hips-genitals) enter in the grabbage category.

The location where it occurs is usually public. The frotteur chooses carefully the places where he can act on his erotic/sexual desires in full freedom. Manifestations,

public events, concerts, buses, and metropolitans are the usual surroundings where the frotteur can easily fool the victim, getting lost inside the crowd. This permits him to act undisturbed and to especially experience physical contact with the victim without causing any particular physical harm. The frotteur is rarely aggressive and usually doesn't act like a typical sex offender.

18.2.1.6 Stalking

Although stalking is not classified as a paraphilia in the DSM, it is surely one of the most worrying of the latest criminalized erotic preoccupations. Forensic psychiatry has defined various motivations for arrested stalkers, like a gradual transition that changes a romantic preoccupation with the victim to a violent one. It is a particularly serious condition since not rarely murder occurs. Considered to be a behavior that is produced by the deterioration of an already compromised mind but not necessarily a paraphilic one, stalking is not rarely correlated with sexual sadism.

18.2.2 Non-criminal Forms of Paraphilia

18.2.2.1 Fetishism

Fetishism is described as a form of recurrent and intense sexual arousal from either the use of nonliving objects or a highly specific focus on non-genital body parts. Fetishism has a range of manifestations that vary from *infantilism*, where the individual dresses up in diapers and pretends to be a baby, to the far more common use of a female undergarment for arousal purposes.

It came to attention that fetishism is often combined with masochistic fantasies and acts: a man that gets excited only when a woman wears a certain type of shoe (generally high heels), usually wants that said woman walk all over him with these same shoes, etc. Often the fetish involves unpleasant or degrading sensations (e.g., female socks need to be filthy and stinky). It may occur that fetishism is associated with a transvestic disorder, meaning men that like to dress up as women.

Lately there has been some criticism regarding what is to be considered a fetish and what not. Some psychiatrists sustain that not everything considered different by our rigid norms needs to be called a fetish. In our culture some body parts (like breasts, butts, lips, etc.) and garments (like panties, miniskirts, bras, etc.) are considered normal and so they are legitimized, while other body parts and garments are not and so get cataloged as pathological only because our dominant erotic culture doesn't consider them erogenous. It needs to be clarified though that in most fetishism disorders the garment that is considered the main attraction is so even when isolated from the female body. The use of objects to play out erotic fantasies, such as vibrators or dildos, is not to be considered a fetish.

18.2.2.2 Sexual Masochism

Sexual masochism disorder is characterized by an intense recurrent sexual arousal that manifests itself through fantasies, desires, or behaviors consisting in the need of being humiliated, bound, beaten, tied, or made to suffer in a way or another. To be

considered clinically relevant, said fantasies or sexual behaviors need to persist for a period of at least 6 months and cause a significant discomfort in one of the important spheres of a person's life (social, occupational, etc.). Frequent practices are bonding, genital tying, cigarette burning, biting on various body parts, autoflagellation, and anal stimulation with dildos, etc.

It is diagnosed over a range of behaviors from the need to nearly asphyxiate oneself to the request to be spanked by the partner in order to be excited. It may be the most commonly acknowledged form of female paraphilia, although it is still more common among men. Sadists and masochists sometimes find one another and work out an arrangement to act out their fantasies and occasionally reverse roles.

18.2.2.3 Transvestic Disorder

The concept of cross-dressing, which is the basis of the transvestic disorder, has always rendered the description of this paraphilia very complex and contradictory. In literature transvestic disorder and transvestic fetishism were considered synonymous or just simply variations of one another, but the fifth edition of the DSM classified it as a specific paraphilia saying it is characterized by a discomfort the individual experiences that is relieved only by his acting out his fantasies usually consisting in cross-dressing.

It's fundamental understanding the various shades of cross-dressing that are individualized and interpreted on the basis of three elements of sexual identity (gender identity, gender expression, and sexual orientation); these are observed inside a continuum that goes from the androgynous, to the gender mimic (drag queen or drag king), on the transvestic homosexual, to transgender, until what is the maximum expression of the difficult integration of the physical and psychical identity that is gender dysphoria.

The transvestic disorder is a paraphilic disorder where an individual, despite his gender identity, gender expression, and sexual orientation, has sexual fantasies and arousal patterns only when cross-dressing. Usually this disorder is referred to exclusively by the male gender. These men can get aroused even by simply wearing an article of female clothing or lingerie or by putting an act of a real gender transformation that implies not only clothing in general but also jewelry, bags, various accessories, makeup, and wigs.

Recent researches have shown that 88% of the men suffering from transvestic disorder have a heterosexual orientation and that they're mostly engaged in stable intimate relationships.

18.2.2.4 Paraphilia Not Otherwise Specified

There are numerous other sexually deviant fantasies or behaviors that do not fit any of the paraphilic categories described here or variations that do not meet the full criteria. The diagnosis of paraphilia not otherwise specified can be given in these situations, including such examples as telephone scatologia (obscene phone calls), necrophilia (if not part of a sexually sadistic diagnosis), partialism (exclusive focus on part of the body), zoophilia (animals), coprophilia (feces), klismaphilia (enemas), and urophilia (urine). Sometimes the act of rape would fit in this category if another paraphilia such as sadism did not fit the particular case.

18.3 Epidemiology

Paraphilias rarely cause personal distress, and individuals with these disorders usually come for treatment pressured by their partners or the authorities. Thus, there are few data on the prevalence or course of many of these disorders.

Pedophilia affects about 1% of the male population [15]. As pedophilia is the paraphilia most shown from media [16], it is not surprising that most research on the prevalence of pedophilia involves samples of individuals in forensic contexts. Consequently, there is nothing known about the ways to live with that sexual interest without causing damage [16].

Notwithstanding the potential for reporting bias, paraphilic disorder is mainly a male disorder at 90–99% of cases, except for masochism where female prevalence may be higher [17].

Scientifically sound information about unusual paraphilia is very scarce [15]. Acts of frotteurism and exhibitionism are frequent, but the number of perpetrators seems to be much smaller [18]. In fact, through the victim self-reports, the lifetime victimization rates have been estimated ranging from 33 to 52% for women [18].

18.4 Etiopathophysiology

The etiology of paraphilias is still unknown. Several hypotheses, including psychological and biological elements, have been postulated to give an explanation for the generation of complex emotional, cognitive, and behavioral phenomena present in paraphilias.

Since Krafft-Ebing and Freud's initial theories [1, 2] a number of psychological explanations about the development of paraphilias have been presented. Table 18.2

Table 18.2 Psychological theories of paraphilia and child molestation

	Theory	Description
Paraphilia	Castration anxiety [2]	A severe castration anxiety during the child's development makes for a substitution of the mother with a symbolic object
	Anxiety over arousal to the mother	The anxiety leads to the development of "safe" sexual practices/behaviors with inappropriate sexual partners (pedophilia, zoophilia) or through the absence of a real sexual contact (exhibitionism and voyeurism)
	Cognitive distortions [19]	Distortions in thinking, or thinking errors, provide a way for an individual to give himself or herself permission to engage in inappropriate or deviant sexual behaviors (it is all right to have sex with a child as long as the child agrees; watching a woman through a window as she undresses does not cause her any harm)
	Childhood abuse/ humiliation [20]	The paraphilia develops as an attempt to master or recreate early childhood abuse
	Acceptance of unrepressed infantile sexual fantasies [21]	The deviant sexual behavior is an alternative to neurotic development

Table 18.2 (continued)

	Theory	Description
Child molestation	Four preconditions model [22]	According to this theory, there are four underlying factors involved in child molestation. Specifically, emotional congruence (they find sex with children to be emotionally satisfying), inappropriate sexual arousal (they find their deviant behavior sexually arousing), inability to meet their sexual needs in a socially appropriate way (blockage), and disinhibition (they are able to behave in ways contrary to social norms)
	Quadripartite model [23]	This model identified physiological sexual arousal, cognitive distortions that justify sex with children, personality problems, and affective dyscontrol as the main components of child abuse
	The integrated theory [24]	It proposed that individuals who engage in sexual activity with children during their own childhood go through development adverse events. During puberty, their sexual fantasies may involve scripts that include aggression and sex. These youths may have a lack of self-regulation skills and social skills and may experience negative states that increase the probability of their engagement in inappropriate sexual behavior
	The pathways model [25]	There are multiple pathways that lead to behavior involving the sexual abuse of a child. Each one of the pathways involves a set of dysfunctional psychological mechanisms that constitute vulnerability factors that are influenced by distal and proximal factors including environmental, cultural, and biological events
	The integrated theory of sexual offending (ITSO) and integrated theory of sexual reoffending (ITSR) [26, 27]	Two integrated models explain the onset, development, and maintenance of sexual offending behavior and reoffending. It examines factors that affect the developing brain and its neuropsychological functioning like genetic variations, neurobiology, evolution, and ecological factors (personal circumstances and physical environment)
	Cognitive distortions [28]	Child sex offenders' cognitive distortions, including impairment of social cognition abilities, are complex neuropsychological and behavioral phenomena, composed of several and distinct cognitive components
	The social disorganization theory [29]	This theory considers elements of social disorganization (economic and social disadvantage, community cohesion, and population ((in)stability) as potential predictors of child sexual abuse

lists and briefly describes the most common psychological theories that have been postulated for the development of paraphilias [2, 19–29].

Some studies show how paraphilias and paraphilic disorders, as complex multifactorial phenomena, are correlated with genetics [30], life stress events [31], neurotransmitters, and endocrinological factors. Focusing on forensic samples, there is also evidence of a correlation between paraphilia and aggression [15]. Table 18.3 lists some biological factors associated with paraphilias.

Table 18.3 Biological factors implicated in etiopathophysiology of paraphilias

	Research findings
Genetics	– *Altered dopamine receptor genes* – *Altered COMT gene* – *Altered DAT gene* – *Altered serotonin transporter gene* – *Altered serotonin receptor type 2A gene* – *Altered MAO gene* – *Altered tryptophan hydroxylase 2 gene* – *Altered BDNF gene* – Altered androgen receptor gene
Endocrinological modifications	– Prenatal androgen exposure – Testosterone – Hypothalamic-pituitary function – Prolactin levels
Neurotransmitter disbalance	– *Low serotonergic inhibition* – *High dopaminergic excitation*
Neuropsychological alterations	
General neuropsychological dysfunctions	– Lower total IQ – Lower levels of academic achievement – Lower job capacity
Specific neuropsychological dysfunctions	– Verbal word fluency – Verbal and spatial working memory – Attention – Executive functioning
Structural brain alterations	– *Volume reduction of amygdala and hypothalamus* – *Limbic system (including temporal lobe)* – *Frontal abnormalities* – Lower gray matter volume of the dorsomedial prefrontal and anterior cingulated cortex

In italic are incoherent results

Among the most replicated findings in subjects with paraphilic behaviors and paraphilic disorders, we find the presence of life events (particularly those stressful events that occurred during childhood, including sexual abuse), a number of head injuries (before of 13 years), lower intelligence quotient (IQ), shorter stature, higher rates of left-handedness (sinistrality), and altered D2:D4 ratio.

As showed in Table 18.3, several genes have been associated with paraphilias. However, no specific gene seems to be linked to paraphilias supporting the theories that paraphilic behavior is at least an expression of polygenic combination or the results of gene(s) × environmental factor(s) interaction(s). A recent study of paraphilic sexual offenders (pedophilic child molesters and rapists) and controls showed no association between a history of sexual offense and the distribution of genotypes or alleles of dopamine receptor genes (DRD1, DRD2, DRD4), catechol-*O*-methyltransferase gene (COMT), dopamine transporter gene (DAT), serotonin transporter gene (SLC6A4), serotonin type 2A receptor gene (5HTR2A), tryptophan hydroxylase 2 gene (TPH2), monoamine oxidase A gene (MAOA), and brain-derived neurotrophic factor gene (BDNF) [32].

Androgen receptors and their numerous mechanisms can be implicated in sexuality and paraphilia in every aspect of sexual behavior—not only autonomic

functions but also emotional, motivational, and cognitive aspects. Inappropriate sexual arousal has been also hypothesized to be generated by abnormal circulating levels of androgens. Furthermore, testosterone participates in excitatory and inhibitory processes of sexual functions by modulating the activity of mainly dopaminergic neurotransmitter systems [33]. Not only testosterone but also some other endocrinological and neurochemical parameters could be disturbed in pedophilic patients and child molesters; these include changes in hypothalamic-pituitary function, prolactin levels, and dopaminergic or serotonergic functions [34].

A relation was also found between prenatal androgen exposure and sinistrality in pedophilic men with a history of sex offences against children [31]. Furthermore, the prenatal testosterone exposure influences the D2:D4 ratio, but the data are equivocal, and no firm conclusions have been drawn regarding the absolute relation between hand preference and D2:D4 [31].

General and specific neuropsychological functions result altered in paraphilias, particularly in those individuals affected by pedophilia. In their meta-analysis, Cantor et al. showed the association between sexual offending and lower IQ (ranging between 90 and 95), particularly in the adult sexual offender sample; moreover, they demonstrated a significant correlation between IQ level and victims' age (lower IQs, lower (child/adolescent) victims' age) [35]. Joyal et al. found a significant impairment of executive functions among people with sexual deviance: they showed impaired verbal skills, with deficit in verbal fluency and in verbal processing and memory [36]. Moreover, a different cognitive profile was also observed in the sex offenders [37]. Performances in higher-order executive function tasks were lower in sex offenders against children than those of sex offenders against adults; except for lower scores in verbal fluency and inhibition, sex offenders against adults showed cognitive performances similar to those of non-sex offenders [37].

Among pedophilic men, Sucky et al. found that those with sex offences against children are characterized by a low processing speed, that appears not as a slow/deliberate response style but as a fundamental neurocognitive weakness. This constitutive impairment of perception processing and information integration supports a general neuronal processing deficit in pedophilic sex offenders against children, providing, moreover, an additional contribution to the neurodevelopmental etiological hypothesis of pedophilia [38].

From a German multi-side research project on the neural mechanisms underlying pedophilia and sex offences against children (called NeMUP; http://www.nemup.de/), Massau et al. [39] evaluated the executive functioning in pedophiles with and without a history of sex offences against children, child molesters without pedophilia and non-offending controls. Pedophiles with or without a history of sex offences against children show a worsened response inhibition ability. However, only non-pedophilic offenders showed additionally disabled strategy use ability. Moreover, they found that those performances were affected by age: only in pedophiles, response inhibition worsened with age, while age-related deficits in set-shifting abilities were restricted to non-pedophilic subjects.

Literature shows brain abnormalities in individuals with pedophilia [40]. A recent study from the German research network NeMUP [41] suggests that child sex offenses in pedophilia rather than pedophilia alone are associated with gray

matter anomalies and thus shed new light on the results of previous studies on this topic. In fact, although no difference in the relative gray matter volume of the brain was specifically associated with pedophilia, the statistical parametric maps show a significant child sex offending-related pattern of above *vs*. below the "normal" gray matter volume in the right temporal pole, whereas non-offending pedophiles exhibit larger volumes than offending pedophiles. Furthermore, the results of this study show that the lower gray matter volume of the dorsomedial prefrontal or anterior cingulate cortex was associated with a higher risk of reoffending in pedophilic child molesters [41].

Sartorius et al. [42] reported that, during a functional magnetic resonance imaging (fMRI) paradigm of sexually non-explicit images, in respect to control, male subjects with pedophilia showed an abnormally increased amygdala activation profile for children pictures rather than adult ones. These findings support the hypothesis that an increased emotional arousal for children relative to adults is present in pedophilia. A review of brain alterations in pedophilia [43] shows that case studies of men who have committed sex offences against children implicate frontal and temporal abnormalities that may be associated with impaired impulse inhibition. Moreover, structural neuroimaging investigations show volume reductions in pedophilic men. Although the findings have been heterogeneous, smaller amygdala volume has been replicated repeatedly [43].

Sexual sadists, relative to non-sadists, showed greater amygdala activation when viewing pain pictures. Sexual sadists, but not non-sadists, showed a positive correlation between pain severity ratings and activity in the anterior insula [44].

Nevertheless, functional neuroimaging has not been able to support the association of pedophilic behavior with frontal lobe disorder [45]. However, structural brain modifications observed in pedophilia have been suggested to affect brain networks for sexual stimulus processing through impaired functional connectivity, which may account for atypical sexual arousal patterns as well as prevalent affective symptoms and neuropsychological deficits of subjects affected by pedophilia [46].

Massau et al. [47], in a study on fMRI of pedophilic men and healthy controls, showed the presence of neural correlates of moral judgment in pedophilia. In particular, they showed that scenarios depicting sex offences against children compared to those depicting adults were associated with higher patterns of activation in the left temporoparietal junction (TPJ) and left posterior insular cortex, the posterior cingulate gyrus, as well as the precuneus in controls relative to pedophiles and vice versa. Moreover, the lack of association between brain activation and behavioral responses in pedophiles seems to suggest a biased response pattern or dissected implicit valuation processes. Kargel et al. [48], in an fMRI study of pedophiles with and without history of hands-on sex offences against children as well as healthy non-offending controls, found the presence of neuronal correlates. Compared to offending pedophiles, non-offending pedophiles exhibited superior inhibitory control as reflected by the significantly lower rate of commission error, inhibition-related activation in the left posterior cingulate and the left superior frontal cortex that distinguished between offending and non-offending pedophiles, while no significant differences were found between pedophiles and healthy controls. The

authors concluded that heightened inhibition-related recruitment of these areas as well as decreased amount of commission errors is related to better inhibitory control in pedophiles who successfully avoid committing hands-on sex offences against children [48].

For medical personnel's differential diagnosis process, it is important to be aware of the fact that paraphilias sometimes also emerge during neurodegenerative disorders such as Parkinson's disease, in some cases as a side effect of treatment [15]. Also, some neurological diseases based on dysfunctions of limbic structures (including amygdalae, hippocampi, and temporal lobes) may determinate hypersexuality (such as the case of Klüver-Bucy syndrome) or paraphilic behaviors (such as the case of temporal lobe seizures or tumors). Moreover, paraphilias have been associated with the presence of other psychiatric disorders; however, it is not yet clear if this comorbidity has etiopathophysiological implications.

18.5 Methods for Diagnosing Paraphilia and Paraphilic Disorders

The most important method for ascertaining the phenotype of sexual preference is the clinical exploration [31]. In this process, it is possible to assess the sexual preference structure in detail including the differentiation between specific paraphilia and paraphilic disorders. The Tanner stages have proven useful for the exploration of sexual preference [31] and are an essential component of the diagnostic procedure of treatment and research programs [49]. These five stages describe the process of physiological maturing by focusing on the development of the secondary sex characteristics from stage 1 (prepubescent) to stage 5 (adult) [50]. The Tanner stage 1 concerns the prepubescent developmental phase, displaying a complete lack of secondary sex characteristics showing no facial or pubic hair, no penile or scrotal enlargement in males, and no breast development or pubic hair growth in females. Tanner stage 2 corresponds to the onset of breast budding in females and testicular enlargement in males. Tanner stage 3 depicts the breast and areola development in females, continued testicular growth, and initial penile lengthening in males. Tanner stage 4 corresponds to increased breast and areola growth and initial separation from surrounding breast tissue in females, while in males, testicular volume increases, scrotum darkens, and penile elongation continues. Tanner stage 5 represents full maturity, complete breast development, and separation from surrounding breast tissue in females, full penile growth and scrotum darkness and testicular volume in males, and full pubic hair coverage in both [50].

Phallometry has long been the "gold standard" in assessing sexual preferences, but other methods have been developed as the viewing time paradigm (measuring the length of time a participant spends looking at specific images as an indicator for sexual preference) [51] and the eye tracking and pupil dilation [52]. These methods have not yet been used in the sexual age preference measurement of pedophiles though [31], but seem to be promising nevertheless.

18.6 Treatment

Sadly, the therapy for paraphilia has scarcely been expound upon, since it's very rare that those suffering from it decide to seek help from a therapist, unless they are caught in the act or someone has forced them to do so. Even in these cases the patient is very rarely motivated or cooperative, very similar in some ways to a drug addict. Also, there is quite a difference between paraphilic disorders that imply a crime and those who don't.

Four general approaches are employed to treat paraphilias and they are typically multimodal in application.

18.6.1 Evaluation Only

Evaluation only is applied when it is concluded that the paraphilia is benign (does not imply a risk for society) and the patient could be resistant to other therapeutic approaches and does not suffer greatly in terms of social functioning. These patients are often men with private paraphilic sexual pleasures, like telephone sex with a masochistic scenario, etc.

18.6.2 Psychotherapy

Psychotherapy for paraphilia can consist in changing, at least temporarily, the erotic script of a patient, even though there is great controversy about the ability of criminal paraphilic minds to be changed. Over the years, all treatments have tended to strongly resemble cognitive behavioral interventions, showing to be very useful in diminishing paraphilic intensifications and gradually teaching these patients better management techniques of the situations that have triggered their acting out. Treatments often consist in attempts of interrupting the paraphilic arousal through pairing masturbatory excitement with aversive imagery or aversive stimuli, social skills training, assertiveness training, and confrontation with the rationalizations that are used to minimize awareness of the victims of sexual crimes and marital therapy.

The self-help movement has created 12-step programs for sexual addictions, and these interventions are usually conducted in group therapy during a period of at least 6 months (generally two encounters every week); the intervention comprehends five modules, each one of which has a variable number of sessions.

Recent evaluation of psychological treatment for adolescent sexual offenders found cognitive behavioral therapy (CBT) and multisystemic therapy (MST) were favorable though randomized studies were sparse, CBT augmented with family therapy was promising, and results for psychosocial education were unconvincing [17].

Although the counseling and psychotherapy for patients with pedophilia are often a core part of prevention strategies, motivation among healthcare professionals to work with this group is low [53].

18.6.3 Medications

The main purpose of the medical treatment of paraphilias consists in reducing the relapse of sex offences and the eventual distress that accompanies said behavior. As reported by various authors, only incarceration is not sufficient to reduce the risk of reiteration, and so the treatment of sexual felons diagnosed with paraphilia needs to aim at preventing sexual violence and reducing the risk to potential victims. The heterogeneity of paraphilia makes it necessary for the medical treatment to be global, where several options of treatment need to be integrated and the therapy needs to be individualized and adaptable to the diverse necessities of the paraphilic subject.

The treatment modalities of the medical therapy in use for paraphilic disorders are divided in essentially two categories:

- Chemical castration
- Pharmacotherapy

The pharmacological intervention aims to significantly reduce or entirely eliminate desire or sexual function with the purpose of controlling fantasies and paraphilic behavior.

In the 1980s, depomedroxyprogesterone was first used to treat men who were constantly masturbating, seeking out dangerous sexual outlets, or committing sex crimes. The drug injection and oral formulation often though enabled these men to work, study, or participate in activities that were previously beyond them because of concentration or attention difficulties. Currently, gonadotrophin-releasing blockers such as leuprolide acetate are sometimes used for this purpose, with possible side effects that are similar to oral depomedroxyprogesterone.

Occasionally, through the years, many drugs were used to reduce the level of sexual arousal: lithium, antidepressants, antipsychotics, and anticonvulsants. No randomized studies have been able to document the real efficiency in case of paraphilic sexual offenders, and the level of scientific evidence is quite mediocre.

These days, the use of SSRIs for the treatment of paraphilic disorders has become the standard of care [54]: in fact, SSRIs can impair libido, orgasm, and ejaculation via their activation of the 5HT2 receptors [55]. Current available data on the use of SSRIs in the treatment of paraphilic disorders are limited. The most studied SSRIs for paraphilic disorders are fluoxetine and sertraline, which have demonstrated efficacy in reducing fantasies and paraphilic behaviors in pedophilia, exhibitionism, voyeurism, and fetishism [56].

Current meta-analyses are, however, still skeptical about the actual effectiveness of these pharmacological agents [57–59].

The mainstay of treatment of paraphilic disorders, especially in sexual offending populations, has been antiandrogen agents. Reductions in testosterone result in reductions of libido, erection, sperm count, and masturbation frequency, which explain why testosterone has become a primary target in the treatment of paraphilic disorders [60].

Antiandrogen treatment is currently offered to sex offenders in many countries as an additional strategy alongside psychotherapy [15]. After cessation of chemical castration, the kinetics of serum testosterone recovery vary with treatment duration [61]. Although chemical castration is not to be considered the preferred paraphilia treatment for obvious ethical reasons, in some cases, such as mental retardation, the administration of antiandrogen medication may be used as an alternative therapeutic method [62]. Because of the coincidence of Parkinson's disease and compulsive sexual behavior, the potential case of an individual with Parkinson's disease and pedophilia is an example of an ethical treatment dilemma. In this case, administering an effective treatment to an individual may have an unwanted side effect of impulse control impairment, with the consequence of potential harm to others [15].

18.6.4 External Controls

Sexual advantage-taking may be stopped by making these deviant behaviors known to most people in the paraphilic's life. The doctor's staff should be told, and the family and the neighbors can be notified of these behaviors. This concept of "external control" is taken over by the judicial system when sex crimes are highly repugnant or heinous. The offender is removed from society for the protection of the public.

Psychiatrists, though, need to acknowledge the limitations of the various therapeutic approaches, since these sexual acting outs can still continue during therapy without the therapist being aware of it. The more violent and destructive the paraphilic behavior is to others, the less the therapist should risk by seeking an ambulatory treatment. Unfortunately, besides a few forensic mental hospitals and occasion prisons, there are limited treatment programs for sex offenders, be they paraphilic or not. Since paraphilias occur in patients with other psychiatric comorbidities, the psychiatrist needs to remain vigilant by choosing a comprehensive treatment program and should not lose sight of the paraphilia just because depressive or obsessive-compulsive symptoms are improved.

References

1. Von Krafft-Ebing R. Psychopathia sexualis. Stuttgart: Verlag Von Ferdinand Enke; 1886.
2. Freud S. Three essays on the theory of sexuality. In: Strachey J, editor. The standard edition of the complete psychological works of Sigmund Freud. London: Hogarth; 1960.
3. Kinsey A, Pomeroy W, Martin C, Gebhard P. Sexual behavior in the human female. Philadelphia: Saunders; 1953.
4. Aggrawal A. Forensic and medico-legal aspects of sexual crimes and unusual sexual practices. Boca Raton: CRC; 2008.
5. Limoncin E, Solano C. Parafilie e disturbi parafilici – Introduzione alle parafilie. In: Jannini EA, Lenzi A, Maggi M, editors. Sessuologia medica. Trattato di psicosessuologia, medicina della sessualità e salute della coppia. Milan: Edra; 2017.
6. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Washington, DC: American Psychiatric Association; 2000.

7. American Psychiatric Association. Paraphilic disorders. In: Diagnostic and statistical manual of mental disorders. 5th ed. Washington, DC: American Psychiatric Association; 2013. p. 685–705.
8. Beech AR, Miner MH, Thornton D. Paraphilias in the DSM-5. Annu Rev Clin Psychol. 2016;12(1):383–406. https://doi.org/10.1146/annurev-clinpsy-021815-093330.
9. World Health Organization. International statistical classification of diseases – for mortality and morbidity statistics (ICD-11-MMS). Geneva: World Health Organization (WHO); 2018. http://www.who.int/classifications/icd/revision/en/. Accessed 10 Jan 2018.
10. World Health Organization. The ICD-10 chapter V: classification of mental and behavioural disorders. International statistical classification of diseases and related health problems, 10th revision (ICD-10). Geneva: World Health Organization (WHO); 1992.
11. World Health Organization. F65 Disorders of sexual preference. In: ICD-10 Version 2016. http://apps.who.int/classifications/icd10/browse/2016/en-/F65. Accessed 10 Jan 2018.
12. World Health Organization. Paraphilic disorders. In: ICD-11 Beta draft (mortality and morbidity statistics). https://icd.who.int/dev11/l-m/en-/http%3a%2f%2fid.who.int%2ficd%2fentity%2f2110604642. Accessed 10 Jan 2018.
13. Limoncin E, Carta R, Gravina GL, Carosa E, Ciocca G, Di Sante S, et al. The sexual attraction toward disabilities: a preliminary internet-based study. Int J Impot Res. 2014;26(2):51–4. https://doi.org/10.1038/ijir.2013.34.
14. Limoncin E, Galli D, Ciocca G, Gravina GL, Carosa E, Mollaioli D, et al. The psychosexual profile of sexual assistants: an internet-based explorative study. PLoS One. 2014;9(2):e98413. https://doi.org/10.1371/journal.pone.0098413.
15. Konrad N, Welke J, Opitz-Welke A. Paraphilias. Curr Opin Psychiatry. 2015;28(6):440–4. https://doi.org/10.1097/yco.0000000000000202.
16. Gross M. Paraphilia or perversion? Curr Biol. 2014;24(17):R777–80.
17. Thibaut F, Bradford JMW, Briken P, De La Barra F, Häßler F, Cosyns P, et al. The World Federation of Societies of Biological Psychiatry (WFSBP) guidelines for the treatment of adolescent sexual offenders with paraphilic disorders. World J Biol Psychiatry. 2016;17(1):2–38. https://doi.org/10.3109/15622975.2015.1085598.
18. Clark SK, Jeglic EL, Calkins C, Tatar JR. More than a nuisance: the prevalence and consequences of frotteurism and exhibitionism. Sex Abus. 2016;28(1):3–19. https://doi.org/10.1177/1079063214525643.
19. Abel GG, Becker JV, Cunningham-Rathner J. Complications, consent, and cognitions in sex between children and adults. Int J Law Psychiatry. 1984;7(1):89–103.
20. Stoller RJ. Perversion: the erotic form of hatred. New York: Pantheon; 1975.
21. Abel GG, Osborn CA, Twigg DA. Sexual assault through the life span: adult offenders with juvenile histories. In: Barbaree HE, Marshall WL, Hudson SM, editors. The juvenile sex offender. New York: Guilford; 1993. p. 104–17.
22. Finkelhor D. Child abuse: new theory and research. New York: Free Press; 1984.
23. Hall GCN, Hirschman R. Sexual aggression against children: a conceptual perspective of etiology. Crim Justice Behav. 1992;19(1):8–23. https://doi.org/10.1177/0093854892019001003.
24. Marshall WL, Barbaree HE. An integrated theory of the etiology of sexual offending. In: Marshall WL, Laws DR, Barbaree HE, editors. Handbook of sexual assault: issues, theories and treatment of the offender. New York: Plenum; 1990. p. 257–75.
25. Ward T, Siegert RJ. Toward a comprehensive theory of child sexual abuse: a theory knitting perspective. Psychol Crime Law. 2002;8(4):319–51. https://doi.org/10.1080/10683160208401823.
26. Ward T, Beech A. An integrated theory of sexual offending. Aggress Violent Behav. 2006;11(1):44–63. https://doi.org/10.1016/j.avb.2005.05.002.
27. Thakker J, Ward T. An integrated theory of sexual reoffending. Psychiatry Psychol Law. 2012;19(2):236–48. https://doi.org/10.1080/13218719.2011.561765.
28. Navathe S, Ward T, Gannon T. Cognitive distortions in child sex offenders: an overview of theory, research & practice. J Forensic Nurs. 2008;4(3):111–22. https://doi.org/10.1111/j.1939-3938.2008.00019.x.

29. Mustaine EE, Tewksbury R, Corzine J, Huff-Corzine L. Differentiating single and multiple victim child sexual abuse cases: a research note considering social disorganization theory. J Child Sex Abus. 2014;23(1):38–54. https://doi.org/10.1080/10538712.2014.863260.
30. Blanchard R, Kolla NJ, Cantor JM, Klassen PE, Dickey R, Kuban ME, et al. IQ, handedness, and pedophilia in adult male patients stratified by referral source. Sex Abus. 2007;19(3):285–309. https://doi.org/10.1177/107906320701900307.
31. Tenbergen G, Wittfoth M, Frieling H, Ponseti J, Walter M, Walter H, et al. The neurobiology and psychology of pedophilia: recent advances and challenges. Front Hum Neurosci. 2015;9:344. https://doi.org/10.3389/fnhum.2015.00344.
32. Jakubczyk A, Krasowska A, Bugaj M, Kopera M, Klimkiewicz A, Łoczewska A, et al. Paraphilic sexual offenders do not differ from control subjects with respect to dopamine- and serotonin-related genetic polymorphisms. J Sex Med. 2017;14(1):125–33. https://doi.org/10.1016/j.jsxm.2016.11.309
33. Jordan K, Fromberger P, Stolpmann G, Muller JL. The role of testosterone in sexuality and paraphilia – a neurobiological approach. Part I: testosterone and sexuality. J Sex Med. 2011;8(11):2993–3007. https://doi.org/10.1111/j.1743-6109.2011.02394.x.
34. Jordan K, Fromberger P, Stolpmann G, Muller JL. The role of testosterone in sexuality and paraphilia – a neurobiological approach. Part II: testosterone and paraphilia. J Sex Med. 2011;8(11):3008–29. https://doi.org/10.1111/j.1743-6109.2011.02393.x.
35. Cantor JM, Blanchard R, Robichaud LK, Christensen BK. Quantitative reanalysis of aggregate data on IQ in sexual offenders. Psychol Bull. 2005;131(4):555–68. https://doi.org/10.1037/0033-2909.131.4.555.
36. Joyal CC, Black DN, Dassylva B. The neuropsychology and neurology of sexual deviance: a review and pilot study. Sex Abus. 2007;19(2):155–73. https://doi.org/10.1177/107906320701900206.
37. Joyal CC, Beaulieu-Plante J, de Chanterac A. The neuropsychology of sex offenders: a meta-analysis. Sex Abus. 2014;26(2):149–77. https://doi.org/10.1177/1079063213482842.
38. Suchy Y, Eastvold AD, Strassberg DS, Franchow EI. Understanding processing speed weaknesses among pedophilic child molesters: response style vs. neuropathology. J Abnorm Psychol. 2014;123(1):273–85. https://doi.org/10.1037/a0035812.
39. Massau C, Tenbergen G, Kargel C, Weiss S, Gerwinn H, Pohl A, et al. Executive functioning in pedophilia and child sexual offending. J Int Neuropsychol Soc. 2017;23(6):460–70. https://doi.org/10.1017/s1355617717000315.
40. Polisois-Keating A, Joyal CC. Functional neuroimaging of sexual arousal: a preliminary meta-analysis comparing pedophilic to non-pedophilic men. Arch Sex Behav. 2013;42(7):1111–3. https://doi.org/10.1007/s10508-013-0198-6.
41. Schiffer B, Amelung T, Pohl A, Kaergel C, Tenbergen G, Gerwinn H, et al. Gray matter anomalies in pedophiles with and without a history of child sexual offending. Transl Psychiatry. 2017;7(5):e1129. https://doi.org/10.1038/tp.2017.96.
42. Sartorius A, Ruf M, Kief C, Demirakca T, Bailer J, Ende G, et al. Abnormal amygdala activation profile in pedophilia. Eur Arch Psychiatry Clin Neurosci. 2008;258(5):271–7. https://doi.org/10.1007/s00406-008-0782-2.
43. Mohnke S, Muller S, Amelung T, Kruger TH, Ponseti J, Schiffer B, et al. Brain alterations in paedophilia: a critical review. Prog Neurobiol. 2014;122:1–23. https://doi.org/10.1016/j.pneurobio.2014.07.005.
44. Harenski CL, Thornton DM, Harenski KA, Decety J, Kiehl KA. Increased frontotemporal activation during pain observation in sexual sadism: preliminary findings. Arch Gen Psychiatry. 2012;69(3):283–92. https://doi.org/10.1001/archgenpsychiatry.2011.1566.
45. Habermeyer B, Esposito F, Handel N, Lemoine P, Kuhl HC, Klarhofer M, et al. Response inhibition in pedophilia: an FMRI pilot study. Neuropsychobiology. 2013;68(4):228–37. https://doi.org/10.1159/000355295.
46. Poeppl TB, Eickhoff SB, Fox PT, Laird AR, Rupprecht R, Langguth B, et al. Connectivity and functional profiling of abnormal brain structures in pedophilia. Hum Brain Mapp. 2015;36(6):2374–86. https://doi.org/10.1002/hbm.22777.

47. Massau C, Kargel C, Weiss S, Walter M, Ponseti J, Hc Krueger T, et al. Neural correlates of moral judgment in pedophilia. Soc Cogn Affect Neurosci. 2017;12(9):1490–9. https://doi.org/10.1093/scan/nsx077.
48. Kärgel C, Massau C, Weiß S, Walter M, Borchardt V, Krueger TH, et al. Evidence for superior neurobiological and behavioral inhibitory control abilities in non-offending as compared to offending pedophiles. Hum Brain Mapp. 2017;38(2):1092–104. https://doi.org/10.1002/hbm.23443.
49. Seto MC. Pedophilia and sexual offending against children: theory, assessment, and intervention. Washington, DC: American Psychological Association; 2008.
50. Marshall WA, Tanner JM. Variations in pattern of pubertal changes in girls. Arch Dis Child. 1969;44(235):291–303.
51. Mokros A, Gebhard M, Heinz V, Marschall RW, Nitschke J, Glasgow DV, et al. Computerized assessment of pedophilic sexual interest through self-report and viewing time: reliability, validity, and classification accuracy of the affinity program. Sex Abus. 2013;25(3):230–58. https://doi.org/10.1177/1079063212454550.
52. Fromberger P, Jordan K, Steinkrauss H, von Herder J, Witzel J, Stolpmann G, et al. Diagnostic accuracy of eye movements in assessing pedophilia. J Sex Med. 2012;9(7):1868–82. https://doi.org/10.1111/j.1743-6109.2012.02754.x.
53. Jahnke S, Philipp K, Hoyer J. Stigmatizing attitudes towards people with pedophilia and their malleability among psychotherapists in training. Child Abuse Negl. 2015;40:93–102. https://doi.org/10.1016/j.chiabu.2014.07.008.
54. Thibaut F. Pharmacological treatment of paraphilias. Isr J Psychiatry Relat Sci. 2012;49(4):297–305.
55. Bijlsma EY, Chan JS, Olivier B, Veening JG, Millan MJ, Waldinger MD, et al. Sexual side effects of serotonergic antidepressants: mediated by inhibition of serotonin on central dopamine release? Pharmacol Biochem Behav. 2014;121:88–101. https://doi.org/10.1016/j.pbb.2013.10.004.
56. Garcia FD, Thibaut F. Current concepts in the pharmacotherapy of paraphilias. Drugs. 2011;71(6):771–90. https://doi.org/10.2165/11585490-000000000-00000.
57. Khan O, Ferriter M, Huband N, Powney MJ, Dennis JA, Duggan C. Pharmacological interventions for those who have sexually offended or are at risk of offending. Cochrane Database Syst Rev. 2015;2:Cd007989. https://doi.org/10.1002/14651858.CD007989.pub2.
58. Långström N, Enebrink P, Laurén EM, Lindblom J, Werkö S, Hanson RK. Preventing sexual abusers of children from reoffending: systematic review of medical and psychological interventions. BMJ. 2013;347:f4630. https://doi.org/10.1136/bmj.f4630.
59. Schmucker M, Lösel F. The effects of sexual offender treatment on recidivism: an international meta-analysis of sound quality evaluations. J Exp Criminol. 2015;11(4):597–630. https://doi.org/10.1007/s11292-015-9241-z.
60. Craissati J. Managing high risk sex offenders in the community: a psychological approach. New York: Routledge; 2004.
61. Koo KC, Shim GS, Park HH, Rha KH, Choi YD, Chung BH, et al. Treatment outcomes of chemical castration on Korean sex offenders. J Forensic Legal Med. 2013;20(6):563–6. https://doi.org/10.1016/j.jflm.2013.06.003.
62. Park WS, Kim KM, Jung YW, Lim MH. A case of mental retardation with paraphilia treated with depot leuprorelin. J Korean Med Sci. 2014;29(9):1320–4. https://doi.org/10.3346/jkms.2014.29.9.1320.