Needle Phobia in Children: A Discussion of Aetiology and Treatment Options

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Needle Phobia in Children: A Discussion of Aetiology and Treatment Options

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ABSTRACT

In this article we review the current literature surrounding needle phobia, concentrating on clinical symptoms, aetiology and treatment options. Clinical symptoms include sudden increase in heart rate and blood pressure on exposure to needles followed by an immediate slowing of the heart and decrease in blood pressure (vasovagal reflex). The various schools of thought surrounding aetiology of this condition include biological, psychological and psychodynamic theories. Treatment options vary from simple education and reassurance to medication and specific behavioural approaches. Consideration should be given to past trauma associated with the phobia and relevant family factors. Careful clinical assessment will not only identify the problem but will also help to indicate appropriate treatment options.

KEYWORDS

behavioural therapy, needle phobia, psychotherapy, trauma, vasovagal reflex

NEEDLE PHOBIA is a recently defined medical condition that can affect children as well as adults. It is a relatively common condition with specific characteristic features that include anxiety and avoidance behaviour when exposed to needles. We have observed that needle phobia is a particular diagnosis, which includes a wide range and combinations of symptoms in the specific environment of the children's hospital. In this article we aim to address the clinical features, aetiology and available treatment.

Definition

Needle phobia, like blood–injection–injury phobia, is classified as a subtype of the specific phobias, formerly known as simple phobia (American Psychiatric Association

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[APA], 1994). The diagnostic criteria for specific phobias, often characterized by a vasovagal response is as follows:

a. Marked and persistent fear that is excessive or unreasonable, cued by the presence or anticipation of a specific object or situation.
b. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response, which may take the form of a situationally bound or situationally predisposed panic attack.
c. The person recognizes that the fear is excessive or unreasonable. (Note: In children, this feature may be absent.)
d. The phobic situation(s) is avoided or else is endured with intense anxiety or distress.
e. The avoidance, anxious anticipation, or distress in the feared situation(s) interferes significantly with the person's normal routine, occupational (or academic) functioning, or social activities or relationships, or there is marked distress about having the phobia.
f. In individuals under age 18 years, the duration is at least 6 months.
g. The anxiety, panic attacks or phobic avoidance associated with the specific object or situation are not better accounted for by another mental disorder, such as obsessive-compulsive disorder, post-traumatic stress disorder, separation anxiety disorder, social phobia, panic disorder with agoraphobia.

At times, blood–injection type phobia is confused with needle phobia. However the DSM-IV classification specifies that the subtype of blood–injection–injury type is cued by seeing blood or an injury, whereas the needle or the needle penetrating the skin, or the images in anticipation of injection, is the stimulus for anxiety in needle phobia.

Epidemiology

Needle phobia is relatively common with an estimated incidence of around 2–4% in adults and children (Kleinknecht, 1987; Mark, 1988). As mentioned in category b in the

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above diagnostic criteria, exposure to needles causes an immediate anxiety response, which usually leads to avoidance type behaviour. This can easily go undetected but may be brought to a clinician's attention if a patient requires regular injections or is in need of an operation or medication which is life-threatening. The majority of the available literature focuses on the adult population. Jacobsen (1991), reports on a case of a man whose needle phobia came to light when he was diagnosed as being HIV positive and needing daily subcutaneous injections of medication. Zambanini and Feher (1997) describe a woman with diabetes mellitus who refused to have her blood glucose monitored because of needle phobia. It is not only within medical settings that patients with needle phobia are represented. According to Lemasney, Holland, O'Mullane, and O'Sullivan (1988), 5–15% of the population decline necessary dental treatment because they fear oral injections. Needle phobia can also lead to social problems. A fear of needles can interfere with plans for travel or employment. Some people may be discouraged from pursuing careers in medicine or nursing because of their fears (Mark, 1988). Avoidance of blood tests may even lead to legal problems and some people have been charged by the police for failure to agree to blood tests.

Clinical features

Most patients with needle phobia demonstrate a diphasic cardiovascular response when exposed to needles. This is an increase in heart rate and blood pressure when exposed to needles, followed by marked slowing of the heart rate (bradycardia) and lowering of the blood pressure (note: other phobias only show the initial rise in heart rate and blood pressure – not the decrease following the increase). The bradycardia is brought about by a reflex mechanism related to the autonomic nervous system, whereby the initial increase in heart rate causes stimulation of the vagus nerve, which then slows the heart and also causes a vasodilatation thus leading to hypertension. This is the 'vasovagal reflex' and accounts for many of the clinical symptoms. These include nausea, sweating, pallor, weakness, and in some cases fainting. Usually the blood pressure returns to normal within a few hours and symptoms pass. However, in some cases the vasovagal fainting can lead to cerebral hypoxia leading to focal or generalized seizures (Lin, Ziegler, Lai, & Bayer, 1982; Schraeder, Pontzer, & Engel, 1983). There are a number of case reports of fatalities arising as a result of needle phobia (Caplan, Ward, Posner, & Cheney, 1988; Engel, 1978; Schlesinger, Barzilay, Stryjer, & Almog, 1977). One possible mechanism would be a vasovagal reflex leading to myocardial infarction or interruption of normal heart conduction. Other reported physiological findings in needle phobia are an increase in stress hormones such as cortisol, corticotrophin as well as vasopressin, which may contribute to symptoms experienced (Hamilton, 1995).

Aetiology

Genetics

Needle phobia and vasovagal reflex tend to run in families (Ellinwood & Hamilton, 1991; Hsu, 1978; Goldstein et al., 1982; Kleinknecht & Lenz, 1989; Ost, 1991). The proportion of patients with relatives with similar phobias ranges from 27 to 68% (Spiess et al., 1992; Torgersen, 1979). The concordance of needle phobia was found to be greater in monozygotic twins than dizygotic twins and the heritability is estimated to be around 48% (Torgersen, 1979). It is still unclear as to what specific clinical aspects of needle phobia are inherited but these could range from variation in heart rates, heart conduction times, vasovagal reflex as well as hormone levels (Hanson et al., 1989).

The brain

Although there have been no neuroimaging or post mortem studies on this group of patients, one potential area in the brain for further study would be the cingulate gyrus. Stimulation of the rostral cingulate gyrus in cats results in freely moving cats suddenly freezing still, and physical changes include vasodilatation of skeletal muscle and loss of muscle tone and fall in blood pressure (Lofving, 1961). This is an area which requires further research.

Learned behaviour

Several articles and case examples indicate that needle phobia is usually traced back to one adverse experience with needles involving either doctors or dentists (Mark, 1988). The negative conditioning leads to a learned response to needles. Ost et al. (1991) showed that 52% of patients with needle phobia had previous adverse experiences and another 24% traced their fear to witnessing another child have a negative reaction (vicarious conditioning). This phenomenon of development of behaviour from learning by observation was first described by Bandura (Taylor, 1991) in his social learning theory: learning adverse responses by observation. Children can also learn from the anticipatory adverse statements of their parents. The parents convey to their child that injections are something to be scared of.

Psychoanalytic

Freud (1919) wrote that phobias arose from anxiety displaced from an internal drive and a realistically threatening external stimulus, to a neutral phobic object. The anxiety leads to involvement of defence mechanisms such as displacement, projection, avoidance and repression. These defence mechanisms eliminate anxiety and the anxiety is controlled at the cost of creating a phobia in which the neutral object has become an object that needs to be controlled.

Object relations

Object relations theory developed by Klein, Fairnbairn, Winnicott and others (Gabbard, 1989) focuses on the relationships an infant has with parents, particularly the mother. The infant will create representations of these parents, that is objects, in his mind and will also make representations of relationships with these objects. Sometimes the infant identifies with objects and exhibits behaviour like his parents, and sometimes he will introject the parent. When the parent is introjected the infant will behave as if he were communicating with his parents. Where Freud explained human motivation as the need to discharge sexual energy, object-relation theorists are of the opinion that the primary force of human beings is seeking gratification through relationships with people.

Some theorists furthermore define a drive, which leads to loving people, and a drive which leads to envy and hate. Because it is difficult for a child (and for an adult) to feel these two feelings at the same time it needs to split the feelings. The child will *project* the hateful feelings in the mother and subsequently fears that the mother will act as such and this causes great anxiety in the child. In order to preserve the image of a loving parent the child will project the loving feelings in the mother and feel hateful about itself. Because the hate is unbearable the child will project the hate back in the parent and feel love, which is followed by the anxiety for mother's hate, etc. This oscillating process continues throughout life. Children might also learn to project this hate onto another person – the other parent, a sibling – or on a spider, or a needle.

Evolution

Hamilton (1995) speculates on one possible reason for a 'needle phobia' trait to be selected during evolution of a species. He suggests that needle phobia is akin to fear of piercing, stabbing and that the majority of violent deaths in evolutionary history have been caused by skin penetration from teeth, claws, knives, arrows, etc. Thus, a reflex that resulted in the learning of a strong fear of skin puncture has selective value in teaching humans to avoid such injuries. Mark (1988) suggests that vasovagal reflex seen in needle phobic patients is an adaptive version of 'tonic immobility' sometimes seen in animals. This is a response whereby an animal will freeze on being approached. This response may increase survival since predators tend to attack prey that is moving and to lose interest when it becomes still.

Treatment

In view of treatment we suggest like Trijsburg et al. (1996) that there are two different types of needle phobia. The first is iatrogenic, and the needle phobia is mainly determined by the extent of the vasovagal reflex in anticipation of the injection. The symptoms are not as severe and the reflex is clearly recognized in the behaviour. It is thought that these types of disorders are effectively treated with education, relaxation, autogenic training and cognitive-behavioural therapy. Reassurance and educating the patient is valuable in helping the patient feel more comfortable and in charge. Consideration should also be given to the room and environment in which the invasive procedure is to take place. If the patient is able to take the invasive procedure whilst supine, then elevation of the legs will help maintain cerebral perfusion and minimize fainting. The second type is much more severe, the vasovagal reflex less recognizable and the aetiology often complex, possibly relating to some form of trauma. In many cases, iatrogenic needle phobia may have been reinforced when patients were restrained as children, while in other cases the needle indeed has become an object on which anxiety is projected; links with forms of abuse, physical, sexual and emotional, have been made (Daniels, 1995; Jacobsen, 1991). These often require psychotherapeutic interventions.

As pain is a subjective experience it is important to treat each child on an individual basis. We also recognize that more research is needed in this area, but difficulties quantifying pain experience in children and ethical issues restrict possibilities of further studies (Fassler, 1985).

Medical

We would like to point out that the majority of people do not enjoy and indeed experience a degree of pain when having an injection. Thus, any means of minimizing the pain and discomfort is welcoming. Use of topical anaesthesia in the form of an ointment at the needle site will minimize sensitivity of the skin and is extremely useful when dealing with children. In fact, we have observed that the child can sometimes perceive the whole procedure of applying the topical cream as nurturing and therapeutic. In some cases, oral pre-medication such as diazepam given prior to the procedure may help relax the patient, this is mainly used by adolescents and adults. Furthermore, it is common for patients who are undergoing psychotherapeutic treatment to have a complementary medical treatment, for example anti-anxiolitics or anti-depressants, such as imipramine (Gabbard, 1989), but also benzodiazepines and nitrous oxide gas. These are not normally used methods of treatment in young children, but certainly not unknown. In our experience, we have known some children who received general anaesthesia prior to a 'simple' invasive procedure like an injection.

Education

An educational approach includes explanations about the medical treatment, the working of the needle, discussions around the decision to take blood within the medical treatment and exploring the procedure of taking bloods (Hamilton, 1995). A secondary effect of this educational approach is the containing quality this usually has for the child. The educational approach proves to be more beneficial for older children and adolescents, who have stronger rational defences, which implies that the child can think through and rationalize the procedure.

Relaxation, autogenic training and distraction

In cases of mild specific phobias it might be useful to consider relaxation techniques. This can be muscular relaxation, involving tensing and relaxing various muscle groups, meditation, guided imagery and autogenic training. Meditation is based on the principle that the patient learns to concentrate on a thought, word, object or some mental state. In guided imagery, especially useful with young children, a patient is instructed to conjure up a picture, which is held in mind during the medical procedure (Taylor, 1991). Like meditation, and to a certain extent guided imagery, autogenic training is not just a relaxation technique. Rather than achieving a state of low arousal, it aims to find a psychophysiological equilibrium. A patient is encouraged to imagine feelings, sensations or a scene that may make the sensation occur but is warned not to try to make the sensation occur (Sarason & Sarason, 1989). Concentration must remain a passive experience. There is evidence that typically the autonomic nervous system is affected by autogenic training.

Distraction methods are widely used in the treatment of children with specific phobias. Videogames have been used to control anticipatory symptoms in children in the paediatric hospital setting (Redd et al., 1987). Other distraction techniques involve children blowing bubbles and party-blowers during the injection procedure. Pacing of the child's breathing can then be carried out as the child blows and the parent counts out loud (Manne, Redd, Jacobson, Gorfinkle, & Schorr, 1990).

Behavioural therapy

Often the reported intervention is systematic desensitization (Hamilton, 1995). Patient and therapist together set up a fear hierarchy. The hierarchy is then encountered, either by guided imagery (in vitro) or in reality (in vivo). It begins with the induction of a relaxed state using relaxation techniques. While the person is relaxed, images that are related to the fear are fed to the patient, either in vivo or in vitro. Step by step patient and therapist make their way up in hierarchy to reach a rather fearless state when injected. The principle of systematic desensitization is that the relaxation response competes with previously learned phobic responses (Sarason & Sarason, 1989). As a result the fear is extinguished and replaced.

Flooding, a rapid intense exposure, is not often used with specific phobias as it generally creates adverse reactions. This method is not relevant for needle phobic children because it would mean giving the child repeated injections until the fear is extinguished. However, it is possible to expose the child to a degree of flooding in imagination (in vitro) (Boy & Kwee, 1984). Like Ollendick and Frances (1988), we have not been able to find studies researching in vivo flooding for needle phobic children.

Other forms of treatment include the use of video. An example of injection is provided by a preferably same-age child, which is observed by the child needing an injection. Klingman, Malamed, Cuthberg, and Hermecz (1984) describe successful interventions using videotapes in children with dental phobia. The authors described two groups, one

group called the participant modelling group and one the symbolic modelling group. The first group practices while the videotape was shown and the second group were told that the video was a preparation before they were receiving an injection. The participant modelling group received better results. Participant modelling was thus found to be an effective method in combination with the use of a video. Observation of another patient undergoing a treatment is often referred to as participant modelling (Trijsburg et al., 1996). According to Ollendick (1979) participant modelling is the most effect modelling procedure in the reduction of fears in children.

Cognitive-behavioural therapy

Often in work with these children it is worthwhile exploring the ideas the child has around needles and health. Irrational beliefs and fear of medical procedures may prevent the child from participating in treatment (Butler, 1989) or jeopardize treatment success. The patient may fear a catastrophic consequence (Last & Blanchard, 1982) such as the needle breaking off in their arm (White & Sellwood, 1995) or the needle being pushed all the way in and then left there (Rice, 1993). The therapist will challenge these cognitions and encourage the patient to examine their validity using techniques such as education, observation, behavioural experimentation and exposure (Shapiro, 1989).

White and Sellwood (1995) describe a case in which a patient rated her belief in the statement 'The needle will snap easily' as 45%. This belief was challenged by asking the patient to break a needle, first on its own and then when it was embedded in an orange, which she agreed was a similar level of firmness to her arm. After this experiment, the patient rated her belief that the needle would snap in her arm as 3%.

Eye movement desensitization and reprocessing

Eye movement desensitization and reprocessing (EMDR) uses saccadic eye movement to reduce anxiety and disturbances associated with traumatic memories. Originally used in the treatment of post-traumatic stress disorder (PTSD) (Shapiro, 1989), this procedure has been extended to other disorders including phobias. After EMDR, adult needle phobic patients report a decrease in fear (Kleinknecht, 1993; Lohr, Tolin, & Kleinknecht, 1995) but generalization is limited and re-sensitization can occur. This is a relatively new treatment and empirical support for its use with specific phobias is still meagre (De Jongh, Ten-Broeke, & Renssen, 1999). EMDR can be used with young children but caution needs to be applied to ensure they are not re-traumatized. Children between the ages of 8 and 12 years handle this treatment readily, but younger children require more help, time and attention (Tinker & Wilson, 1999).

Hypnosis

A pre-trance discussion covers the patient's history and a good rapport is established with the therapist. During the trance a number of different techniques may be used. These techniques include relaxation, symptom reduction, symptom substitution and symptom transformation using suggestion (Erickson, 1954; van Dyck, Spinhoven, & van der Does, 1991). The client may be given instructions to remain calm during injections (Nugent, Carden, & Montgomery, 1984) or they may be asked to replace the negative ideation with positive thoughts and to see themselves overcoming their phobia (Alden, 1997).

Psychotherapeutic-based interventions

We have seen a number of children who do not meet the criteria of needle phobia according to DSM-IV, but present with anxieties around medical interventions. It is sometimes

hard to give the anxieties related to life-threatening, chronic and/or severe illness a clear clinical diagnosis but careful history taking and observation may elicit the symptoms of needle phobia or other conditions such as PTSD or separation anxiety. In some cases patients may present with a number of overlapping symptoms and conditions. In these cases, a more psychotherapeutic intervention might be useful, for example an individual psychodynamic or psychoanalytic intervention, a systemic intervention or a combination of the two. The technique of psychodynamic therapy is to focus on the provision of conscious understanding, primarily through the use of interpretation of the patient's verbalizations and behaviour during the session. Conscious insight may not be as important a component of the treatment as previously thought; the emotional experience associated with the therapist tolerating thoughts and feeling previously considered intolerable by the patient may be equally, or even more, important (Roth & Fonagy, 1996).

Family intervention

Often the family play a large role in managing the child's anxiety around needles. Parents themselves may have similar phobias to their children and this may jeopardize the treatment of the chid. In a situation like this, family intervention might be indicated. One possible technique by Ginsburg, Silverman, and Kurtines (1995) called the 'transfer of control' model involves the gradual fading of control from therapist to parent, and then to child. This involves training parents in management strategies to deal with their child's fear and anxieties and to facilitate the child's exposure to the phobic situation.

Trauma

Some children may show symptoms of needle phobia as a result of trauma experienced during a previous attempt at medical intervention or even as a result of a seemingly unconnected traumatic experience in which the child did not experience control over a particular or recurring situation in their life. Although a needle phobia might in essence be seen as an isolated symptom, it often represents real anxieties about health, control over sometimes rather intrusive medical interventions and/or difficult life circumstances.

Case example 1

Tracy, aged 9, suffered from a form of an immune deficiency disorder most of her life. Treatment of this condition required frequent injections and infusions. At the age of 3, she started to develop a phobia around needles. When it came to having injections, she would undress herself, starting with throwing her shoes and clothes. In her early years she would also head-bang against a wall in protest. In her later years she started to become distressed even at the sight of an injection and within minutes would scream, kick and bite at people around her. She would often shout at her parents and yell comments such as 'You want to kill me!'. When she was 8, she was filmed during an episode of her anger around injections. After she had settled down, the video was played back to her. Tracey was shocked at what she saw and said she did not recall the situation and did not recognize herself. Whilst working with Tracey, it was also apparent that there were a number of family-related issues which contributed to the anxieties around injections. In particular, her father was extremely anxious about his daughter's life-threatening disorder that he could not face seeing his daughter distressed and would often walk out of the room when it was time for the infusions. The package of treatment thus offered to the family included help for the parents. Tracey's father was taught to learn to own his anxiety and accept the unbearable insecurity that his daughter may die. As the father became more contained, his wife disclosed that she had felt isolated from her husband who had been caught up in his own anxieties around his daughter's illness. After a short period, Tracey was eventually able to

successfully complete behavioural work on her needle phobia with the help and support of her parents.

Case example 2

Tom, a 12-year-old boy, was removed from his mother by social services at the age of 3. His mother had neglected him emotionally and there was also concern due to the fact that he also displayed sexualized behaviour that he may have been exposed to form of sexual abuse. Tom suffers from an immune-suppressing illness and needs regular injections every two months. During the injection procedure, he would often scream for his mother and then try to kick and destroy anything within his reach. His behaviour was experienced as very distressing, leaving staff extremely upset after the episodes. Numerous attempts at behavioural interventions proved unsuccessful. At the age of 10, a decision was made to offer him individual psychotherapy. Tom engaged in the therapy and as he became more comfortable and safe in the sessions, he started to talk openly about his relationship with his mother. Later it was possible to hypothesize that Tom had been traumatized the moment he had been taken away from his mother. He had perceived no control whatsoever over this situation and having bloods taken (in which he had no control) reminded him of the trauma. In the therapy sessions, the issues of loss of his mother and his feelings of abandonment and loss of control were explored and addressed. As the sessions went on, Tom began to feel more contained and relaxed around needles and his phobia gradually diminished.

Some remarks on restraining children (and adolescents)

In our experience, it is not uncommon to occasionally see children in hospital settings being gently restrained in order to give a blood test. This is a contentious area and raises lots of issues around the rights of the child, etc. Although we do not have a hard line view on this area, common sense dictates that each child is different and thus will react in his or her own way. However, rather than rushing into a decision, some consideration should be given to factors such as the age of the child, who should do the restraining, what to tell the child before and after the procedure, etc. In some cases, children may wish to be held and indeed this was the case for the boy in example 2.

Conclusion

Needle phobia is a condition, which occurs in children as well as adults. Once recognized, it needs to be taken seriously and should not be dismissed as the child being difficult and defiant. Appropriate treatment options available should be considered and applied in a sensitive and supportive manner. More research is needed on this often-neglected subject including specific attention to aetiology and consideration of relation trauma to needle phobia.

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