RESEARCH REPORT

Needle fixation, the drug user’s perspective: a qualitative study

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Abstract

Aims. Changing drug users’ injecting behaviour is central to the project of drug services. Information about the idea of “needle fixation” is fragmentary and of uncertain relevance to contemporary injecting drug users. The aim of the study is to describe injecting drug users’ ideas about needle fixation. Participants and design. Twenty-four participants, some of whom identified themselves as needle fixated, were recruited from four drugs agencies in south Wales. Participants took part in semi-structured interviews, recorded, transcribed and qualitatively analysed using Atlas/ti software. Findings. Participants describe a range of behaviours and experiences which fit with previous ideas of needle fixation, including ritualization, substitution of other drugs, injection of water and associations with deliberate-self-harm and sex. Participants describe high levels of needle aversion and add detail to previous partial descriptions of needle fixation. Conclusions. Issues conveniently considered together as needle fixation are current among injecting drug users and may be relevant to the inability of some drug users to change from injecting drug use.

Introduction

I think, oh I want the injection, I want the injection, you know, it, it is quite deeply rooted, the psychology behind it, I mean I do not actually know anything about it myself but I know that I am addicted to the needle, no doubt (17, M, 32, POLY, 17, I) (see Box 1 for a key to the participant description).

The popularity of intravenous injection for the administration of illicit drugs has been attributed to the unrivaled rapidity of onset of the drug “rush” coupled with the cost-effectiveness of this method (see for example Tyler, 1995; Gossop, 1996). The transition to injecting is perceived

Box 1. Participant description (in parenthesis after each quotation)

<table>
<thead>
<tr>
<th>Interview number</th>
<th>Sex (M = male, F = female)</th>
<th>Age in years</th>
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<tr>
<td>Main drug injected (OP = opiates, AM = amphetamines, POLY = poly drug use)</td>
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<tr>
<td>Total duration of injecting drug use in years</td>
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<td>Injection status at the time of the interview (I = injecting, NI = not injecting)</td>
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“reverse transition” (Strang et al., 1992), or move away from injecting, would be predicted only if powerful influences—social, psychological or practical—move the drug user down the hierarchy. The identification of factors that promote or inhibit changes in mode of administration has been the focus of a growing body of literature (Strang et al., 1992; Griffiths et al., 1994). Since the advent of HIV and hepatitis C the development of the concept of “route transition interventions” (Hunt et al., 1999) has been central to the mission of drug treatment work. The following observation from one of the participants in this study illustrates why.

In prison I smuggled syringes in and stole some from the medical room. But those were dirty; they had been used by diabetics. That was all I had access to at the time, and there were sets of syringes going around the wing that 40, 50 people might have used. You had to force them into the vein, the damage was bad from each injection but it was worth it once you had found it you know (17, M, 32, POLY, 17, 1).

The behaviour that may be defined as “needle fixation” is a psychological phenomenon that places a very real constraint on the potential for changing both drug administration habits and preferences. To the injector, the near instantaneous effects of the intravenous administration of a psychoactive drug must in itself be a powerful reward, but it is reported by some injectors that the means of administration has in itself become rewarding. The separation of these related reinforcers is a difficult, yet important task. In a previous review paper (Pates et al., 2001) we have discussed the limited published empirical evidence, case reports and expert opinion on the subject of needle fixation. We began with a possible atheoretical definition of needle fixation: “Repetitive puncturing of the skin with or without the injection of psychoactive drugs via intravenous, subcutaneous or intra-muscular routes, irrespective of the drug or drugs injected or the anticipated effects of the drug.” This study has investigated the phenomenon in the context of injecting drug use, but it may possibly be found in people who inject non-psychoactive drugs (e.g. insulin), receive acupuncture or gain enjoyment from tattooing or piercing. If such patterns of injecting are confirmed in intravenous drug users, then the rewarding effects of injecting per se must be recognized and the attributes of those factors providing secondary gain need to be identified. Whether a conditioning model or a psychodynamic model is proposed it is clear that complex psychological processes are influential in producing and maintaining this behaviour.

The existing literature suggests a number of potentially valuable avenues for exploration that might facilitate understanding of why drug users find the transition out of injecting so difficult. Beyond pharmacology and simple conditioning, there are suggestions that injecting may be linked to sexuality, ritual, deliberate self-harm, self-worth and social role (see for example Howard & Borges, 1971; Levine, 1974; Trebach, 1982; Stewart, 1987; Courtwright, Joseph & Des Jarlais, 1989; Friedman et al., 1998; Pates et al., 2001). There are two main drawbacks to the available literature: (1) the fragmentary nature of the evidence, which needs to be pieced together from uncomfortably disparate types of data, too often anecdotal, from different cultures over four decades; and (2) the failure to define what is meant by needle fixation.

In this study, we sought to address a number of questions. Do a sample of UK drug users at the end of the 1990s describe the features of needle fixation, as hypothesized and described in the existing literature, when they talk about their use of needles? Do they describe other phenomena not previously recognized? Can the views of users be synthesized with existing understandings to develop a coherent framework to describe or explain the phenomenon of needle fixation, and might this point the way to future enquiry and intervention?

**Methods**

Ethical approval for the study was obtained from the Health Authority Local Research Ethics Committee. All participants were given verbal and written information about the project and signed a consent form. Participants were not paid for taking part. Participants were recruited from current or past injecting drug users attending any one of four drug agencies in south Wales (UK). Two of the agencies are health service treatment agencies and two non-statutory “street agencies”. Participants were recruited from advertisement posters in waiting areas, and by key-worker referral. Participation was actively sought from individuals who thought that they might
have been needle-fixated at some time, but it was not a prerequisite that they be needle-fixated at the time of interview.

Interviews were conducted confidentially, in a setting convenient for the participant, by NB and KA between December 1998 and May 1999. Eighteen interviews were conducted individually and three with couples. Twenty-four participants were interviewed: 20 men (83%) and four women. The mean age of the sample was 33 years (range 21–51). The mean duration of illicit drug use was 15.3 years (range 1.5–35), and of injecting 11.6 years (range 1.5–33). Fifteen (62%) had injected drugs within the past month.

Participants were asked to talk about their injecting behaviours using open questions. The interviewers also used predetermined prompt questions to generate ideas about possibly important areas identified from the literature, if these were not mentioned spontaneously. The prompted areas were: initiation into injecting, the individual’s injecting routine, injecting equipment, the drugs (and anything else) injected, attitudes to and expectancies of injecting, difficulties with injecting, pleasures of injecting, difficulties experienced with stopping injecting, social behaviour and injecting and the relationship between injecting and sex.

All interviews were recorded onto minidisk and transcribed into an Atlas/ti (Muhr, 1997) database. Atlas/ti is a qualitative data assessment computer software package which allows the coding and analysis of datasets such as transcribed interviews. KA did the initial analysis indexing the data. The transcripts of the interviews were analysed by KA who conducted a preliminary categorization. AJM then returned to the original complete transcripts, refined the discourse content of these categories and sought further possible themes. RP and AJM then reviewed these further, and the final selection of statements and their sequencing and commentary decided upon.

The selection of quotations has been guided by the intentions to cover all the views expressed, including those that contradict the consensus understanding of the participants and authors. They were also chosen to avoid redundancy and repetition. There is no weighting for the number of times participants described particular phenomena. First-person rather than third-person descriptions have been given whenever possible. The quotations are highly selected, to represent the range of opinions presented, but have not been culled to present a view that conforms to the authors’ hypotheses. The words of the interviewees are reproduced unedited. No attempt has been made to reflect the dialects or accents of participants in printed form. Therefore, for example, “goin’’ is written as “going” and “gotta” as “got to”.

Results

Initiation to injecting and social role

A wide range of views was expressed towards injections before and after commencement of injecting drug use. “Normal” fear of needles and injections before starting an injecting career was common. Perhaps more surprising were descriptions of persistent aversion to needles, sometimes even after many years of injecting:

I had always said I would never inject because I cannot stand needles. The pain, and the hospitals and the junkie image. The first time I did not watch you know. A few people say they will never hit up because of their fear of needles but when it comes to it, they soon get over it (16, M, 30, AM, 10, NI).

I was terrified; needles made me pass out as a child. When I went for injections down to the school clinic, I would faint. Even now, I will nearly pass out when we have to have blood tests. I will feel the whistling in my ears and start to feel dizzy (21, M, 51, OP, 33, I).

I do not like seeing anyone else doing it. I have seen my boyfriend do it once or twice and I am panicking and I am really jittery, so I am not a good person to have around when you have got a needle (07, F, 33, AM, 13, I).

One common way to overcome this initial fear is to have a friend inject you, while looking away.

Once I had a habit and I was shown how to do it myself then, it took a long time really because I did not even like needles like, like when I used to do it in the beginning I used to have to turn my head away (10, M, 25, AM, 4, NI).

For some, injecting is a source of shame, a private vice.

I do not really like the injecting part to be honest with you. I never really liked needles.
Its kind of degrading, I feel ashamed of what I do (13, F, 21, OP, 5, I).

I knew I should not be doing it but I thought I can get away with it and nobody is ever going to know I have done it, so I am not going to feel that dirty (15, M, 29, AM, 5, NI).

For others, from the outset, injecting is a manifestation of a wider wish to reject societal values.

It is a taboo thing, you should not do it, you know it is naughty, really naughty, and I like to do things that are against the grain (02, M, 50, AM, 25, I).

For one participant the stigmata of injecting were celebrated as evidence of group membership, perhaps evidence of a rite of passage.

We was always going around showing each other our bruises and it was like when you give your girlfriend a love bite, yeah, it was horrendous to look at, but I suppose it was like a love sign or something like that (02, M, 50, AM, 25, I).

Pharmacology
The most obvious reasons for the injection of psychoactive drugs are the lack of waste and the more rapid onset of drug effects, the so-called “rush”. Many users clearly identified the instrumental nature of injecting as the primary and sometimes sole reason for injection.

It takes much too long to get the effect of a hit smoking it, you know that you have to smoke it for about an hour before you ... compared to 5 minutes, you know, there is a hell of a difference (01, M, 37, OP, 20, I).

I have not got a lot of veins left, but I will still sit down and rummage around my body for a place to jack up because I need to have a fix. Not because I need the needle but I want to give the drug the maximum performance, if I swallow it, it makes me sick (02, M, 50, AM, 25, I).

I remember going out and buying what is called a “rocket”, what the old doctors used to use, a real fancy piece of gear, made of glass, and stainless steel, like you see on Dr Kildare or something like that, and I used to keep this all polished up (02, M, 50, AM, 25, I).

It is not the fixing that is the thing; it is the getting everything together. You have got to use a Zippo lighter and you have got to use this and that (03, M, 41, AM, 10, I).

Ceremony and following the right procedure can become of central importance.

It is like a kid with a toy, you know, or a monk with a religion, you can take it as high or low as you want to go (02, M, 50, AM, 25, I).

One participant described achieving a state of almost meditative detachment in the ritual process.

It kind of took things out of your mind as you wanted to get it right you know, you are focused just on that and anything else that’s going on around you, you do not notice and do not care about (05, M, 34, OP, 12, NI).

By contrast, another participant described the excitement of the build up as almost greater than the rush or drug effects.

I am like quick get me home and I cannot get the words out fast enough sometimes and that is like without doing the stuff. I have had the rush holding onto it. You get a buzz out of that, getting it all prepared, it is like an anti-climax after (11, M, 30, OP, 14, NI).

The injection itself
Having completed the preparations, the next focus for comment was the penetration of the skin and the first sight of blood on entering a vein.

The only way that I can describe it is that when I am sitting and I fill the syringe and I see the syringe near my groin, I seem to relax and when I see the blood I seem to relax a bit more and then I get the rush (05, M, 34, OP, 12, NI).

When you are new to injecting you start to sort of feel the hit as soon as the needle hits your skin even though it can not have possibly entered your blood stream or hit your brain,
you do feel it and they call that needle buzzing. It is so strong; it is like the buzz itself before it actually hits you (06, M, 41, AM, 7, NI).

There is two parts to it you know, you stick the needle in and you pull back on the plunger and blood flows into the barrel and when you see that happening it triggers something itself inside and that is almost half of the buzz. Like once you see that blood flow into the barrel, that’s like, yes, I have got in and the knowledge that all I need to do now is just push down on the plunger and I am there. You know, so it’s like, getting that first bit sorted, getting it right, that is half the battle. (04, M, 30, OP, 1.5, I)

The idea that there may be “drug” left in the syringe may then become a reason for flushing with blood, without removing the needle.

You get your injection and the blood comes back and there is a little bit left in there. So what you do is you pull back a little bit and then flush but you will get people who will really pull back and flush it and then flush it again and flush it and flush it and flush it (08, M, 47, OP, 15, I).

We must have sat there for about 20 minutes while this guy worked the blood in and out of the needle and into himself, it was like Dante’s Inferno, you know, it was like, really horrible (02, M, 50, AM, 25, I).

**Skill at injecting**

Injecting is a skill, which when accomplished can have effects on both the self-esteem of the user, and if practised on others, their role and social standing.

I felt like I had accomplished something, something which not long before I had really hated. The fact of doing it. I thought now I do not have to rely on anyone (15, M, 29, AM, 5, NI).

It used to give me a buzz. Because they could not do it themselves they would ask me and I would do it for them. Looking back it was sad. I could get anybody anytime you know (22, M, 37, AM, 7, I).

**Injecting for the sake of injecting: substituting other drugs and water**

One way of maximizing the number of injections is to divide the available drug into smaller hits.

I get maybe say three or four hits out of the one little wrap. Whereas before it would just be chuck it on you know, and also whatever fun it is that I get that I can not really explain, out of injecting it as well, it’s more opportunity for sticking a needle into my arm. I am not getting much of a rush, if any. I am still getting the effect of the drug but you do not get the rush (04, M, 30, OP, 1.5, I).

Experimentation with a range of substances is a feature of some participants’ stories.

Dope, which gave me a dirty hit, em, victory V gums, these little diamond shaped tablets that are around; I used to think “I have got a new works, what can I inject with it?” (06, M, 41, AM, 7, NI).

This seeking after new experiences can be distinguished from the use of drugs of a different class, or water, if for whatever reason the preferred drug is not available. The injection of water, perhaps akin to flushing with blood takes various forms.

I reuse from the filter, like once, maybe twice, possibly you might get a bit out of it but after that you get nothing, but I will still do it anyway (04, M, 30, OP, 1.5, I).

That is the difference between taking it just by snorting it or dropping it. That is the only difference between it, the rush, is the feeling of the rush like, and you think you are going to have the feeling of the rush just by injecting like water or anything (10, M, 25, AM, 4, NI).

I can remember times when I have been withdrawing and just hitting up water would satisfy me for an hour or two, so I suppose there is a bit to it like, that is psychologically down to the needle and having put something inside you (01, M, 37, OP, 20, I).

**Pain**

Injection is necessarily a painful process. Participants described very varied responses to pain, from those who only reluctantly put up with the pain for the sake of the rush, to those who may
enjoy the pain and those who suggest that for some the process of injecting may reflect some underlying tendency to self-injury. The first participant describes a willingness to defer relief from withdrawal symptoms until injecting equipment is available.

I would wait all night to get a needle, I would not think of chasing the dragon, I just would not think. We would just wait and be sick (20, F, 50, OP, 33, I).

It hurts and I do not like that hurt but it is just what has got to happen if I want that feeling; I mean I still go out and do it (07, F, 33, AM, 13, I).

I think it could be sort of associated with self-mutilation. I mean I used to cut all my arms, you know. A lot of addicts take drugs because they like the pain. Well because they are in pain basically. A lot of addicts self mutilate and things like that so it could be connected to that, you know a form of causing pain to yourself (20, F, 50, OP, 33, I).

As might be expected, the increasing personal cost and diminishing returns had led some participants to change their attitudes to injecting.

When it dragged out longer and longer and you started getting blood all over the place and hitting yourself and feeling pain. Then I began to be less enamoured of the needle and there was many a time when I have just turned the needle around and put it in my mouth and squirted (02, M, 50, AM, 25, I).

I have got to the stage when I wish I could just press a button and get it over and done with (08, M, 47, OP, 15, I).

No veins and perseverance
One common problem among injecting drug users is the gradual collapse of usable surface veins because of overuse, poor technique, infection and the direct toxic effects of the drugs and adulterants.

I went from not having to use a tourniquet, my arms were just big huge veins and all my friends were jealous, and then in the end I had a strap on my arm and my friend was holding my arm, and I was just in and out, poking, just trying to find a vein (15, M, 29, AM, 5, NI).

If you missed with just a bit you were in agony. They were nearly 3 years old they were but they were horrible, like bullet holes. And there is how bad I was I was still injecting it in the holes (03, M, 41, AM, 10, I).

I persevere if I cannot get a vein, if I cannot get it in one vein I will be there for hours and I will do it, just to do it, whether I get any speed in my body afterwards is just secondary. I am like a pin cushion sometimes (07, F, 33, AM, 13, I).

Yeah but if you cannot find a vein it is a rush when you get the blood. You think oh wow nice one, I remember being 5 hours looking for an injection, I went through about 80 different needles, I had to keep changing them, keep changing them, because blood kept clotting in them (17, M, 32, POLY, 17, I).

Sex
The idea that there is a relationship between sex and drug use, particularly injecting drug use, is commonplace, but drug users are not necessarily willing to discuss it. As one participant put it:

I will not admit it but there must be somewhere along the line, but you would never get a junkie to admit it, never, but it is so bloody obvious (08, M, 47, OP, 15, I).

Three possible types of sexual association are suggested by the participants, the first is the use of sexual analogies for the experience.

There is that simple analogy of a penis and a vagina, you know, something entering, entering the skin and giving you a rush, which is similar to an orgasm (08, M, 47, OP, 15, I).

And he gave me this hit of speed and it was great, it was like an orgasm (06, M, 41, AM, 7, NI).

The second is the use of injecting as an acceptable reason for intimacy:

I know at least two occasions when a girl has come to me for a hit and it’s like in lieu of sex and everything is as though it was sex, but it was not (02, M, 50, AM, 25, I).

I mean, the fact that people inject, and when they go for, I know that they have got other
veins, will go for the femoral and I think well why? I do not know why, I can obviously sort of, I can, sort of think, it becomes even nearer the sexual act. They usually get someone else to do it (08, M, 47, OP, 15, I).

The third is the attribution of sexual pleasure to partners.

Okay, with my ex partner, when we had had a hit together, she would get off on it because I would be giving her the hit (01, M, 37, OP, 20, I).

It was like the boy who injected me all those years ago, he got pleasure, he used to get off on it, you know (07, F, 33, AM, 13, I).

Only one of the participants described sexual pleasure for themselves and she was uncertain whether the pleasure was more associated with the injection or the drug effect.

You get a fanny-flash, that is what I call it, and it is a wicked feeling (07, F, 33, AM, 13, I).

The associations between sex and injecting were mentioned consistently, but it is difficult to separate the use of sex as a metaphor for the pleasure of injecting, from sexual feelings as a phenomenon produced by the injecting. Given the cognitive nature of eroticism this may be an important distinction, but it may be that sex is used as an analogy because it is one of the most powerful feelings that the interviewees could suggest.

What is needle fixation?
Participants were not specifically invited to define needle fixation but volunteered a range of views. Some were sceptical about the very possibility:

I think there is a bit of a myth about real needle fixation because if someone came along and invented something that um, got into my system three times or say five times quicker than the needle, I’d take that (01, M, 37, OP, 20, I).

Several participants considered that they had seen needle fixation in others, in the form of injecting for the sake of it, or injecting water, but never experienced it themselves:

I have not done it myself, if there is not any drug in that barrel I will not put it anywhere near me (09, M, 29, OP, 4, I).

I know I have not got a needle fixation, because my friend who has got a needle fixation, she will hit up anything, even warm water. Which just seems crazy to me, because unless there is a drug in there why bother? (24, F, 49, OP, 29, NI).

Several participants said that needle fixation is the pursuit of the first ever or early injecting experiences, sometimes perhaps out of nostalgia but also as a result of pharmacological tolerance:

There is always something in the back of my mind thinking I will get the rush I used to, but you never do. I think to get the actual feeling that I am looking for I would have to take enough to probably kill myself (05, M, 34, OP, 12, NI).

Put it this way you never get a hit as good as your first hit (04, M, 30, OP, 1.5, I).

After the first couple of times, you do not get the rush any more (22, M, 37, AM, 7, I).

Several participants tried to convey the way the drug and the act of injection blur one in to the other.

That is the hardest thing to give up like, because you just can not stop doing it like. I do not know, instant, instant hit like. Cannot be bothered waiting. I would rather give up the whole lot (23, M, 26, AM, 2, I).

There is no way I can say I will give up the needle. I have to stop taking the sulphate altogether because they both go hand in hand (03, M, 41, AM, 10, I).

It is like a double helix really, the drug and the needle, sort of intertwined (21, M, 51, OP, 33, I).

The needle is the hardest part of giving it up. I miss the needle before I miss the drug (22, M, 37, AM, 7, I).

I do not think I actually like the speed any more. In fact, I am ill every time I do it now. It is just the needle (07, F, 33, AM, 13, I).

For some participants the act of injecting began to be pleasurable in its own right, and finally the single most pleasurable element of the drug taking process.
I started enjoying actually sticking the needle in my arm (04, M, 30, OP, 1.5, I).

But when you do it, it is right, in fact, it is better than the actual drug that is going in to you (07, F, 33, AM, 13, I).

**Discussion**

The review by Pates *et al.* (2001) highlighted the paucity of the literature regarding needle fixation and the absence of theoretical work exploring or explaining the components of the phenomenon. The purpose of this study was to discover whether self-identified individuals with needle fixation fitted the model proposed in the Pates *et al.* paper. The individuals interviewed were a non-random sample; some self-identified as having “needle fixation” without being aware of any definition of the phenomenon or the reported components. It is noteworthy that themes other than those previously identified were elicited. An example of this is the suggestion of a transition from needle phobia to needle philia mentioned by several interviewees.

There was no prerequisite that participants were needle fixated at the time of the interview. No restrictions were placed on age, duration of injecting history, main drug of use, etc. as such constraints may have led to the exclusion of interesting and relevant cases. It is interesting that common themes were evident across this somewhat skewed sample. As no comparable research exists, this sample may exhibit the characteristics of other needle-fixated individuals, but further research is needed.

Exploratory interviews were employed so that individuals could describe different phenomena to challenge and further refine our working definition of needle fixation. Interviewees were encouraged to talk freely. Prompts were only utilized towards the end of the interview if discussion of a particular aspect had not been volunteered. Categories were constructed by the authors on the basis of past research and prominent themes. It may have been more appropriate to have had independent researchers to allocate statements to categories, but the interviews produced 24 transcripts, each containing up to eight pages of text, and resources did not permit such independent review.

*Do the participants confirm the literature?*

The statements of the participants reflect very precisely all those elements of needle fixation that have been described in the literature (for a review see Pates *et al.*, 2001), but this is the first time that all the phenomena have been elicited from a single cohort of injectors. To give some brief examples; Light & Torrance (1929) discuss the injection of water by withdrawing morphine addicts producing relief. Stewart (1987) describes both the perseverance of some heroin addicts in trying to find a vein and the repeated flushing of blood in and out of the syringe. Trebach (1982) comments on the ritualistic nature of the injecting process. Howard & Borges (1971) refer to the possible sexual connotations of injecting. Levine (1974) in the only entire paper devoted to “needle freaks” describes a woman for whom the pain and probable self-harm elements of the fixation were important. A number of papers mention the status associated with a skilled practitioner of injecting (e.g. Friedman *et al.*, 1998). That all these features were identified among a small number of injecting drug users in south Wales suggests that among injectors of psychoactive drugs these phenomena associated with needle use may be consistent over time and between cultures.

*Do the participants describe new phenomena?*

One common feature of the participants not expected by the authors was the high frequency of aversion to needles up to and beyond the time injecting began. Also of note is the way the participants tease out several elements in areas previously perhaps considered unitary; for example, the layers of possible association between injecting and sexuality (analogy, intimacy and pleasure). It should be remembered that only four of the participants were female, and three of the four were interviewed with their partners. The sex bias of the sample and the circumstances of the interviews may have skewed the results and limited the willingness of the female participants to discuss some aspects of their drug use and sexual behaviour. A larger sample size may have elicited other phenomena, not revealed here or in the previous literature.

*A model of needle fixation*

The literature on needle fixation contains much
that is directly related to associative learning, but in this sample there were very few comments to indicate any awareness that powerful conditioning forces might be at work.

I think it is just... a pleasurable association... you know that if you do that little ritual, you will end up with something you like (06, M, 41, AM, 7, NI).

I am going all goose pimpled just thinking about it now (16, M, 30, AM, 10, NI).

What the participants seem to say is that the learning taking place during drug injection produces not one but a range of conditioned responses. They fall into two general categories. The first group is directly related to the effects of the drug and the process of injecting. Persistence in trying to find a vein, the search for that elusive rush as experienced early on in the injecting career, the use of substitutes, and the ritualization of the process of injecting can all be seen as conditioned responses to the rewarding effects of injecting psychoactive drugs.

The second group of phenomena are those in which the process of injecting has some secondary gain. These include sexual pleasure, the production of pain for masochistic reasons, the release of deliberate self-harm and the social status. For this group, "chaining" might occur. In an operant conditioning paradigm chaining is a model to explain complex behaviours which consist of sequential component behaviours where each component acts as both cue for the next behaviour in the chain and the reinforcer for the preceding behaviour (McMurran, 1994). Thus in the case of needle fixation the act of injecting acts as a reinforcer by the delivery of the drug and as a cue for the secondary response (e.g. sexual response, pain, etc.), and the association between these responses becomes the dominant gain from the injecting process.

In a classical conditioning model the act of drug-taking (the unconditioned stimulus, US) is paired with the environmental factor, i.e. the act of injecting or use of the needle (the conditioned stimulus, CS). This elicits a conditioned response (CR) through the pairing of the environmental cue (CS) with the pharmacological effects of the drug (unconditioned response, UR). Thus a conditioned response (CR) is produced whereby the needle or use of it becomes associated with the pleasure of the drug-taking and this pleasure may be sexual, pain, status, etc.

Future enquiry and intervention
For those who exhibit a seemingly compulsive need to inject, interventions need to be tailored to address their individual reasons for doing so. If needle fixation is a conditioned response then there is a need to try to extinguish the response. If chaining is involved then there is a need to interrupt that sequence of events as early in the chain as possible, i.e. before the point of secondary gain from the injecting. Failure to recognize and address the complex reasons that may underpin injecting for some users may limit the effectiveness of interventions.

There is as yet no clear indication of how the different elements of needle fixation may cluster, or the prevalence of these phenomena in the injecting drug user population. Another unresolved issue is whether certain individuals have a predisposition to become fixated with the needle, or whether the process of injecting is the major determinant. For example, if participant number 20 is correct in her understanding that deliberate self-harm predisposes to a fascination with injection, would this predispose to other phenomena of needle fixation later? Could those with unsatisfactory outlets for sexual expression, unavailability of sexual partners or the inability to perform sexually be attracted to injecting and find some sort of substitute in elements of injecting?

Conclusion
It has been our intention to investigate the extent to which the previous literature can be read as being of relevance to contemporary injecting drug users. The participants in this study share very closely the experiences of previously described users from around the world. The earlier, fragmented accounts support the story of these drug users so that the findings generalize in a way that the recruitment methods and geographical limitation might not suggest. The participants have added to the published story of injecting drug use in the details of what is going on as learning processes move forwards and backwards from the pharmacology to influence a range of behaviours, some extremely hazardous.
References


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