ORIGINAL ARTICLE

Analgesic effect of watching TV during venipuncture

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Aims: To assess the analgesic effect of passive or active distraction during venipuncture in children.
Methods: We studied 69 children aged 7–12 years undergoing venipuncture. The children were randomly divided into three groups: a control group (C) without any distraction procedure, a group (M) in which mothers performed active distraction, and a TV group (TV) in which passive distraction (a TV cartoon) was used. Both mothers and children scored pain after the procedure.
Results: Main pain levels rated by the children were 23.04 (standard deviation (SD) 24.57), 17.39 (SD 21.36), and 8.91 (SD 8.65) for the C, M, and TV groups, respectively. Main pain levels rated by mothers were 21.30 (SD 19.9), 23.04 (SD 18.39), and 12.17 (SD 12.14) for the C, M, and TV groups, respectively. Scores assigned by mothers and children indicated that procedures performed during TV watching were less painful ($p<0.05$) than control or procedures performed during active distraction.
Conclusion: TV watching was more effective than active distraction. This was due either to the emotional participation of the mothers in the active procedure or to the distracting power of television.

In paediatric healthcare, the primary goal of pain management is to minimise suffering while facilitating the success of medical intervention.[1] There are many different approaches to the treatment of acute pain during medical procedures in children, including pharmacological and non-pharmacological measures. The latter may include physical therapies, imagery, hypnosis, relaxation, systematic desensitisation, self affirmation, modelling, information supply, and distraction. A variety of different distractors have been used for pain management in children. These include watching cartoons,[2 3] using party blowers,[4] looking through kaleidoscopes,[5] blowing bubbles,[6 7] non-procedural talk,[8] listening to short stories,[9] humour,[10] listening to music,[11] puppetry,[12 13] and virtual reality glasses.[14 15] A meta-analysis evaluating the efficacy of distraction in children's procedural pain found that distraction reduced children's overall overt behavioural expression of distress.[16] Some reviews are available for a better comprehension of the topic.[17 18]

We know the importance of parents' collaboration in helping children to cope with pain by just their presence and by providing distraction. We recently successfully used this approach in neonatal analgesia.[19 20] We are also aware of power of television to capture children's attention.[21] The difference between these two approaches is that the former is active and involves affectivity, although fear may be transmitted to the child, whereas the latter is passive. Our aim was to assess the analgesic effect of active and passive distraction (parent and television) during venipuncture.

METHODS

Sixty nine children matched for age and sex and their parents participated in the study. The local ethics committee approved the study. Informed consent was obtained from a parent of each child undergoing venipuncture for clinical purposes. Venipunctures were performed between 8.00 and 10.00 am, when the children, all outpatients, came to our hospital for blood sampling. Inclusion criteria were: age 7–12 years old, last meal at least 3 h before venipuncture, no verbal difficulty, no neurodevelopmental delay, and no frequent venipunctures (more than 1/year). Children were randomly assigned to one of the following groups using random numbers from a computer generated sequence: (a) puncture without distraction (C); (b) puncture performed while the mother interacted with the child in order to distract him/her (M); and (c) puncture performed while the child was watching an age appropriate cartoon on TV (TV).

Mothers were also present in the blood sampling room for groups C and TV, but were requested to not do anything to distract the children during venipuncture.

Before entering the room for blood sampling, the mothers and children were told that we were going to assess pain during blood sampling and the scoring system (Oucher scale) was explained; we said we were going to compare pain in different situations, and told them the group they belonged to. Mothers of group M children were asked to actively distract their children during the venipuncture by speaking, caressing, and soothing them.

For the TV group, the children were set in front of a TV screen, at a distance of approximately 2.5 m; movies started at least 120 s before venipuncture. The children were invited to watch the cartoon when it started and no other distraction was then attempted.

No topical anaesthetics were used in any case.

At the end of the session, the children were asked to score the pain experienced using the Oucher scale, a validated visual pain scale scoring from 0 (no pain) to 100 (maximum pain). The Oucher scale is used to assess pain intensity in children as young as 3 years old and includes two separate scales. One scale is a series of six photographs showing a child in varying degrees of discomfort and is used by children who are unable to count by number. Children who are able to count to 100 by ones or tens and can identify the larger of two numbers use the vertical numeric scale (0–100) that is printed next to the faces. All of the children in this study were able to use the numeric scale. The Oucher has been tested for validity and reliability and is widely used for clinical and research purposes.[22] The accompanying parent of the child, usually the mother, scored the level of pain they thought the child felt using the same scale, ignoring the score given by the child.

The data were analysed using the Mann-Whitney test with GraphPad InStat 3.05 software (GraphPad Software, San Diego, CA).

RESULTS

Table 1 shows the characteristics of the population enrolled in the study. Mean pain levels rated by the children were 23.04 (range 0–100, standard deviation (SD) 24.57), 17.39

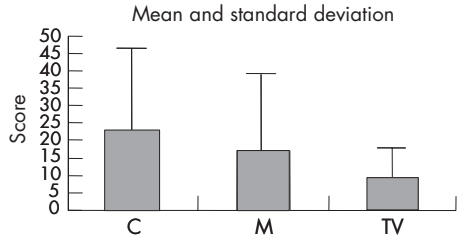

Figure 1 Scores given by the children in the three treatment groups during venipuncture.

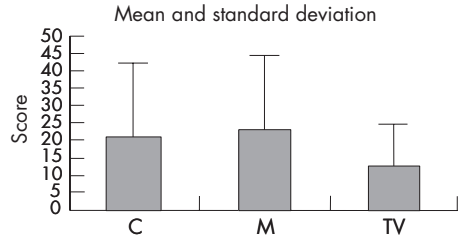

Figure 2 Scores given by the mothers for the three treatment groups during venipuncture.

(range 0–60, SD 21.36), and 8.91 (range 0–60, SD 8.65) for the C, M, and TV groups, respectively (fig 1). Mean pain levels rated by mothers were 21.30 (range 0–80, SD 19.9), 23.04 (range 0–60, SD 18.39), and 12.17 (range 0–50, SD 12.14) for the C, M, and TV groups, respectively (fig 2).

Mothers' and children's scores indicated that venipuncture was significantly less painful in the TV group than in controls ($p = 0.045$ and 0.037, respectively). The main pain scores of the M group were not significantly different from controls in both mothers' and children's evaluation. Some children and mothers scored a 0 pain level, but their number was not significantly different in the three groups. No significant age or sex related differences were found.

DISCUSSION

There have been previous studies on the effectiveness of the audiovisual distraction of television. Cohen *et al*[2] found that 4–6 year old children watching a popular cartoon series felt less pain, while Cassidy *et al* found that watching television during an immunisation injection was not effective in reducing pain in a group of 5 year old children.[3] In adults, Weisenberg *et al*[23] found higher pain tolerance during humorous or longer films, while de Wied and Verbaten showed that emotionally stimulating films modulate pain tolerance.[24] Other authors[15] showed that virtual reality was an analgesic factor.

Distraction performed by mothers has been reported to be an effective analgesic factor.[8 9]

Our study showed that distraction by TV was more effective than distraction by mothers: it provides analgesia (as evidenced by the children's own score of their pain) as well as increasing tolerance to pain (as evidenced by the mothers' scores). Mason *et al*[9] suggested that a passive strategy (such as watching TV) may be more effective than an active one (distraction with an interactive toy) for decreasing the pain of venipuncture because children's distress interfered with their ability to interact with the distractor. It is not easy to find comparable studies because some used non-validated scales,[25 26] while others did not use the Oucher scale or evaluated painful procedures other than venipuncture. Kleiber *et al* studied the effect of two anaesthetic creams (EMLA and EMLA Max) in 30 well children between the ages of 7 and 13 years during intravenous insertion of a 22 gauge Teflon catheter into a vein in the hand[27]; mean Oucher scores in the two groups were 20.5 and 24, respectively. However, using a different 0–100 pain scale during venipuncture, Eichenfield *et al* obtained mean pain scores of 10.9 and 10.8, respectively, for EMLA and EMLA Max.[28] In the former study, pain values with anaesthetic cream are higher than those found by us with the use of TV as a distraction technique, while in the latter they are similar.

The Oucher scale was developed to enable children to express themselves concerning their own pain, so that their word is sufficient to determine pain level; nevertheless, our study also obtained mothers' ratings, which were not significantly different from those of their children.

We did not note any age effect in the three groups, nor any differences between boys and girls.

Fowler-Kerry and Lander[29] showed that distraction significantly decreased injection pain in children, whereas suggestion did not.

Children who are experiencing pain in health care settings of course need the supportive presence of a parent to help them cope effectively. Indeed, children state that having their parent present provides the most comfort when in pain.[30] Yet parents are often not permitted to provide this support. Health professionals often encourage parents to "wait outside" until a procedure is over, believing that this facilitates the child's cooperation, especially for more invasive procedures.

Our results support the benefit of introducing a distracting environment during minor painful procedures in children: the higher pain level reported by children during mothers' efforts at distraction shows the difficulty mothers have in interacting positively at a difficult moment in their children's life. This does not mean that the mothers' presence is negative: although it does not reduce pain, the children will recall that they were not left alone on a stressful occasion. As in all studies in which a patient is requested to score their own pain during a procedure with the help of a non-maskable analgesic tool, this study was not blinded and this was one of its limits.

In conclusion, our study suggests that in primary school aged children watching television may reduce distress during

Table 1 Mean age and sex ratio in the three treatment groups

	C	M	TV
n	23	23	23
Median age (range)	8 (7–12)	9 (7–12)	9 (7–12)
M/F ratio	10/13	12/11	11/12

C, control; M, distraction by mothers; TV, distraction by TV.

What is already known on this topic

- Pain is a stressful for children even for minor procedures.
- Distraction is a well known analgesic manoeuvre.

What this study adds

- Watching TV has a greater analgesic effect than distraction by mothers.
- Watching TV can also increase tolerance to pain in children.

venipuncture more than maternal attempts at distraction. This can also increase tolerance to pain, as evidenced by the mothers' scores. Further studies are needed to assess the effect of these distraction techniques in association with local anaesthetic cream, whose use should be standard practice.

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ARCHIVIST

Activity level and cardiovascular risk

The increasing prevalence of childhood obesity is predicted to result in increased cardiovascular risk. Children should eat less and engage in more physical activity, or so the common dictum goes. But how much physical activity should they engage in? An early (1988) recommendation by the American College of Sports Medicine was that children and adolescents should have 20–30 minutes of vigorous exercise a day. In 1998 the UK Health Education Authority suggested one hour a day of physical activity of moderate or greater intensity. The scientific basis of these recommendations is, however, questionable. Now a study in Estonia, Denmark, and Portugal (*Lancet* 2006;**368**:299–304; see also Comment ibid: 261–2) has led to the conclusion that the amounts of activity recommended in the past are not enough. The study included 1051 9-year-olds and 681 15-year olds. The risk factors measured, and included in a composite risk score, were systolic blood pressure, serum triglyceride, total /HDL cholesterol ratio, insulin resistance, sum of four skin fold thicknesses, and aerobic fitness. Physical activity was measured over four consecutive days (two weekdays and two weekend days) using an accelerometer attached to the hip. (The instrument measures vertical acceleration of body movement but does not measure the activities of cycling, swimming, or load-bearing.) The main finding was an inverse relationship between physical activity levels and composite risk factor score. The single risk factor most strongly related to physical activity was insulin resistance and the overall effect was independent of obesity. For increasing quintiles of physical activity the odds ratios for an ''at risk'' score (composite risk factor score more than 1 SD above the mean) were 3.3, 3.1, 2.5, 2.0, and 1.0 (comparator). In all analyses risk was significantly raised in the first three quintiles of physical activity. For children in the fourth quintile the mean time at accelerometer readings equivalent to walking at about 4 km per hour was 116 minutes a day in 9-year-olds and 88 minutes a day in 15-year-olds.

The authors of this paper conclude that children might have to spend 90 minutes a day in at least moderate physical activity to avoid cardiovascular risk factors, especially insulin resistance. The editorialists suggest that this should be incorporated into the school curriculum.