



Introduction

There is a constant search for ways to avoid the invasive and often painful nature of an injection, particularly in paediatric dentistry. Two new systems developed to address the shortcomings of the traditional infiltration procedures are the following computer-controlled local anaesthetic delivery systems (CCLAD): the Sleeper one[®] and the WAND[®]. By using a CCLAD the amount of anaesthetic fluid injected over a given period of time is regulated. In this way the pressure remains low, which may reduce the pain. The Sleeper one[®] is a new variant with a Permanent Analysis of Resistance system that regulates the injection according to the density of the tissue. This leads to a faster average delivery time and more comfort is expected as a result than with the Wand[®]. Therefore, the aim of this study is to investigate whether there is a difference in pain and distress response of the child when using the WAND[®] compared to the Sleeper One[®], and whether this is influenced by the anxiety level of the child.



Materials and Methods

This study was conducted among 112 children (56 girls) aged 4-6 yr (mean age 66 months, SD 9 months). After consent each child was randomly assigned to the use of either the Wand[®] or Sleeper One[®] based on a randomisation list generated by SPSS (SPSS, 17.0: Chicago, IL, USA). The treatment session was videotaped from the moment the child entered the treatment room and continued until the end of the local anaesthesia delivery. These videotapes were rated by two independent observers, not taking part in the treatment of the children.

Measurements

Pain-related behaviour: Five different pain-related behaviours were recorded as being present or absent during each 15 sec interval of the injection phase. The number of times each behaviour was scored as being present during all 15 sec interval is divided by the total number of intervals scored (Table 1).

Distress: Because the child response and the behaviour of children in dentistry is often a mixture of anxiety and pain (Versloot et al., 2004) and because these two concepts are difficult to separate it was decided to assess distress behaviour also. The highest Venham score (Peak Venham) of each treatment session was considered to be the most important and powerful to a child's conditioning and was therefore used (Table 1).

Self-reported Pain: The Faces Pain Scale - Revised (FPS-R) is used as a self-report measure to assess the intensity of children's pain during local anaesthesia. The FPS-R was shown to be appropriate for use in assessment of the intensity of children's acute pain from age 4 or 5 onward (Figure 1).

Dental anxiety: The parent was asked to complete the parent version of the Dental Subscale of the Children's Fear Survey Schedule (CFSS-DS) on behalf of their child to assess the level of dental anxiety of the patient. In the present study a distinction was made between children scoring lower than 32 (low anxious) and 32 or higher (high anxious).



Figure 1. Faces Pain Scale - Revised

Results

There appeared to be no differences between the Sleeper One[®] and the WAND[®] in all variables, neither for the total group, nor for low and high anxious children separately (Table 1).

Table 1. Proportion pain, pain-related behaviour and distress in relation to type of CCLAD used (Wand[®] vs Sleeper One[®])

	Total group (n=112)					High anxious (n=48)					Low anxious (n=63)				
	Sleeper One [®] (n=52)		Wand [®] (n=60)			Sleeper One [®] (n=21)		Wand [®] (n=27)			Sleeper One [®] (n=31)		Wand [®] (n=32)		
	mean	SD	mean	SD	p	mean	SD	mean	SD	p	mean	SD	mean	SD	p
Muscle tension	0.41	0.39	0.42	0.38	0.765	0.62	0.40	0.47	0.40	0.230	0.27	0.31	0.35	0.34	0.267
Crying	0.17	0.31	0.25	0.34	0.220	0.35	0.36	0.32	0.39	0.696	0.06	0.19	0.17	0.28	0.041
Verbal protest	0.07	0.17	0.07	0.15	0.507	0.07	0.12	0.09	0.18	0.871	0.07	0.19	0.06	0.12	0.443
Body movement	0.03	0.06	0.09	0.18	0.165	0.04	0.06	0.14	0.23	0.198	0.02	0.06	0.04	0.12	0.574
Resistance	0.01	0.05	0.07	0.22	0.070	0.03	0.08	0.11	0.28	0.436	0.00	0.00	0.04	0.16	0.044
Peak Venham (0-5)	0.96	0.86	1.42	1.15	0.842	1.48	0.87	1.56	1.22	0.943	0.61	0.67	1.25	1.08	0.691
FPS-R (0-10)	3.42	4.16	4.10	3.97	0.265	5.43	4.61	4.52	4.17	0.234	2.06	3.25	3.53	3.70	0.220

Conclusion

Although there is no significant difference in reaction of the child using the Sleeper One[®] or the WAND[®], the use of the Sleeper One[®] might be preferred over the WAND[®] for two reasons. First, since the average time of the Sleeper One[®] is shorter, the time the disruptive behaviour lasts is shorter. Second, though not included as a research question, all dentists participating in this study preferred the use of the Sleeper One[®], that is, they evaluated it to be more user-friendly than the WAND[®].