

# A cross-sectional survey investigating care of the primary dentition by paediatric dental specialists in Japan and the UK

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**Objective:** The aim of this study was to compare treatment decisions in primary dentistry between Japanese and UK-based paediatric dental specialists. **Methods:** Four clinical scenarios involving a 6-year-old boy were used to ascertain the clinical opinions of participants. The scenarios presented: (i) a single distal cavity, vital and without pain; (ii) a distal occlusal cavity, vital and without pain; (iii) a large distal occlusal cavity, non-vital and without pain, and (iv) a large distal occlusal cavity, non-vital and painful. Participants were 104 Japanese and 115 UK-based paediatric dental specialists. **Results:** In the first scenario, some UK specialists showed a preference for vital pulpotomy with a stainless steel crown (10.3% compared with 0.9% in Japan). In the second scenario, Japanese participants were more likely than UK participants to offer traditional restorative care (73.6% vs. 24.1%). In the third scenario, 54.7% of Japanese specialists chose to open the pulp chamber, whereas 51.8% of UK specialists selected non-vital pulpotomy with stainless steel crown. In the final scenario, 74.0% of Japanese specialists chose to open the pulp chamber, whereas 51.8% of UK specialists chose not to offer any treatment other than extraction. **Conclusions:** Japanese and UK specialists in paediatric dental care choose different interventions for the same clinical problems.

**Keywords:** Caries, primary dentition, treatment, paediatric dental specialists

In most developed countries, paediatric dental specialists play a leading role in the development of treatment guidelines for children and adolescents. The specialty of paediatric dentistry has a long history and its place within the dental lexicon is well established. However, the training of new members of any specialist workforce should always be underpinned by research evidence as change and adaptation are part of the working lives of all professionals. Recent evidence from the UK<sup>1–3</sup> raises questions on the appropriateness and clinical value of restoring the primary dentition. These studies were retrospective in nature, but they suggest that paediatric dental specialists need to be more reflective and investigate further the appropriateness of the treatment regimes currently offered to young children for the primary dentition.

Another study by the same research group<sup>4</sup> noted that when case scenarios about care of the primary dentition were presented to UK specialists and general practitioners, marked differences in their responses were recorded. General dental practitioners (GDPs) were less interventionist in their treatment planning. Such a finding is unusual in a profession offering care to patients because treatment plans should be driven by clinical evidence and not by habit or custom.

The presence of such differences in treatment philosophy suggests that it is important to look to other countries to ascertain whether dental professionals elsewhere work from the same clinical criteria or whether differences in opinion are prevalent. However, although comparative data are very valuable, it is often difficult to find health care systems with similar payment processes, and cost can and does influence clinical care. One country in which, as in the UK, dental care for children is largely free at the point of delivery is Japan. A universal health insurance scheme removes any comparison difficulties associated with the cost of care. In our previous study, we found that Japanese and UK-based GDPs differed substantially in their views about the best treatment for a young child with a carious molar.

As the dental care systems in these countries are similar, it should be possible to investigate whether Japanese specialists hold similar views to their UK counterparts on restorative care of the carious primary dentition. Such a study would be of great value as it would determine whether or not the treatment strategies selected by UK specialists reflect those employed by another group of dentists whose predominant focus and

training refer to the care of children. It would also inform researchers whether further study of this issue is warranted.

## METHODS

This study employed the clinical case scenarios used by the UK research group (*Table 1*) to record the clinical opinions of Japanese paediatric specialists<sup>4</sup>.

In each of the four case scenarios, participating dentists were instructed to select one treatment from the list of options presented in *Table 1*.

Scenario 1 described a 6-year-old boy with a single distal occlusal cavity affecting less than half of the marginal ridge in a lower right first primary molar. The tooth was vital and the boy was described as having no history of pain. The treatment options were: (i) no restorative treatment; (ii) fluoride varnish application; (iii) atraumatic restorative technique; (iv) traditional

restorative treatment; (v) vital pulpotomy with glass ionomer/composite or amalgam restoration; (vi) vital pulpotomy with a stainless steel crown; (vii) extraction under local anaesthetic; (viii) refer for extraction under sedation, and (ix) refer for extraction under general anaesthetic.

Scenario 2 described a 6-year-old boy with a single distal occlusal cavity affecting more than half of the marginal ridge in a lower right first primary molar. The tooth was vital and the boy was described as having no history of pain. The treatment options were: (i) no restorative treatment; (ii) fluoride varnish application; (iii) atraumatic restorative technique; (iv) traditional restorative treatment; (v) vital pulpotomy with glass ionomer/composite or amalgam restoration; (vi) vital pulpotomy with a stainless steel crown; (vii) extraction under local anaesthetic; (viii) refer for extraction under sedation, and (ix) refer for extraction under general anaesthetic.

**Table 1** Summary of case scenarios and response choices

Scenario	Description of scenario	Response choices
1	A 6-year-old boy has a single distal occlusal cavity affecting less than half of the marginal ridge in the lower right first primary molar. The tooth is vital and the child has no history of pain	<ul style="list-style-type: none"> <li>• No restorative treatment</li> <li>• Fluoride varnish application</li> <li>• Atraumatic restorative treatment</li> <li>• Traditional restorative treatment</li> <li>• Vital pulpotomy with glass ionomer/composite or amalgam restoration</li> <li>• Vital pulpotomy with stainless steel crown</li> <li>• Extraction under local anaesthetic</li> <li>• Refer for extraction under sedation</li> <li>• Refer for extraction under general anaesthetic</li> </ul>
2	A 6-year-old boy has a single distal occlusal cavity affecting more than half of the marginal ridge in the lower right first primary molar. The tooth is vital and the child has no history of pain	<ul style="list-style-type: none"> <li>• No restorative treatment</li> <li>• Fluoride varnish application</li> <li>• Atraumatic restorative treatment</li> <li>• Traditional restorative treatment</li> <li>• Vital pulpotomy with glass ionomer/composite or amalgam restoration</li> <li>• Vital pulpotomy with stainless steel crown</li> <li>• Extraction under local anaesthetic</li> <li>• Refer for extraction under sedation</li> <li>• Refer for extraction under general anaesthetic</li> </ul>
3	A 6-year-old boy has a large distal occlusal cavity in the lower right first primary molar, which is non-vital and has an associated sinus. He has no history of pain	<ul style="list-style-type: none"> <li>• No restorative treatment</li> <li>• Fluoride varnish application</li> <li>• Atraumatic restorative treatment</li> <li>• Traditional restorative treatment</li> <li>• Open the pulp chamber and drain the tooth</li> <li>• Non-vital pulpotomy with glass ionomer/composite or amalgam restoration</li> <li>• Non-vital pulpotomy with stainless steel crown</li> <li>• Prescribe antibiotics alone</li> <li>• Extraction under local anaesthetic</li> <li>• Refer for extraction under sedation</li> <li>• Refer for extraction under general anaesthetic</li> <li>• Open the pulp chamber and drain the tooth</li> <li>• Excavate caries and place a sedative temporary dressing</li> <li>• Prescribe antibiotics alone</li> <li>• Prescribe analgesics alone</li> <li>• Prescribe both antibiotics and analgesics</li> <li>• Extraction under local anaesthetic</li> <li>• Do nothing immediately but refer for extraction under sedation</li> <li>• Do nothing immediately but refer for extraction under general anaesthetic</li> </ul>
4	A 6-year-old boy has a large distal occlusal cavity in the lower right first primary molar in which more than half of the marginal ridge has been destroyed. He is experiencing pain. (Dentists were asked to give their preferred treatment options to immediately relieve the child's pain)	<ul style="list-style-type: none"> <li>• No restorative treatment</li> <li>• Fluoride varnish application</li> <li>• Atraumatic restorative treatment</li> <li>• Traditional restorative treatment</li> <li>• Open the pulp chamber and drain the tooth</li> <li>• Non-vital pulpotomy with glass ionomer/composite or amalgam restoration</li> <li>• Non-vital pulpotomy with stainless steel crown</li> <li>• Prescribe antibiotics alone</li> <li>• Extraction under local anaesthetic</li> <li>• Refer for extraction under sedation</li> <li>• Refer for extraction under general anaesthetic</li> <li>• Open the pulp chamber and drain the tooth</li> <li>• Excavate caries and place a sedative temporary dressing</li> <li>• Prescribe antibiotics alone</li> <li>• Prescribe analgesics alone</li> <li>• Prescribe both antibiotics and analgesics</li> <li>• Extraction under local anaesthetic</li> <li>• Do nothing immediately but refer for extraction under sedation</li> <li>• Do nothing immediately but refer for extraction under general anaesthetic</li> </ul>

Scenario 3 described a 6-year-old boy with a large distal occlusal cavity in a lower right first primary molar which was non-vital and had an associated sinus. The boy was described as having no history of pain. The treatment options were: (i) no restorative treatment; (ii) fluoride varnish application; (iii) atraumatic restorative technique; (iv) traditional restorative treatment; (v) open the pulp chamber and drain the tooth; (vi) non-vital pulpotomy with glass ionomer/composite or amalgam restoration; (vii) non-vital pulpotomy with a stainless steel crown; (viii) prescribe antibiotics alone; (ix) extraction under local anaesthetic; (x) refer for extraction under sedation, and (xi) refer for extraction under general anaesthetic.

Scenario 4 described a 6-year-old boy with a large distal occlusal cavity in a lower right first primary molar in which more than half of the marginal ridge had been destroyed. The boy was described as experiencing pain. Dentists were asked to state their preferred treatment to immediately relieve the child's pain. The options given were: (i) open the pulp chamber and drain the tooth; (ii) excavate caries and place a sedative temporary dressing; (iii) prescribe antibiotics alone; (iv) prescribe analgesics alone; (v) prescribe both antibiotics and analgesics; (vi) extraction under local anaesthetic; (vii) do nothing immediately but refer for extraction under sedation, and (viii) do nothing immediately but refer for extraction under general anaesthetic.

In the Japanese versions of Scenarios 2–4, one additional treatment option, 'cast metal inlay restoration', was added because this treatment is commonly used in Japanese clinics. This response was combined with 'glass ionomer/composite or amalgam restoration' in the analysis of results.

To avoid ambiguity, definitions of atraumatic and traditional restorative treatment were provided. An atraumatic restorative technique was defined as: 'a treatment that involves the removal of soft, demineralised tooth tissue using predominately hand instruments, followed by restoration of the tooth with glass ionomer, and does not usually require the use of local anaesthetic.' Traditional restorative treatment was defined as: 'a treatment that involves the complete removal of soft, demineralised tooth tissue using predominately rotary instruments, followed by restoration of the tooth with either glass ionomer/composite or amalgam, and requires the use of local anaesthesia.'

There are 94,593 dentists in Japan<sup>5</sup>, of whom 4,213 are members of the Japanese Society of Paediatric Dentistry (JSPD). Among these members, 1,596 are specialists<sup>6,7</sup> certified by the JSPD. The percentage of members certified as specialists, therefore, is 38%.

Japanese participants were recruited at the annual Japanese Paediatric Dental Society meeting in Kyushu in 2007. The number of members attending this meeting, including GDPs and specialists, was 576.

The number of specialists was estimated to be 218, or 38% of participants. Delegates registering at the meeting were invited to complete the questionnaire and return it by mail to the Fukai Institute. Approximately half (48%) of the specialists attending the meeting returned a questionnaire, giving a total sample size of 104 participants.

By contrast, UK participants were recruited from the 148 specialists in paediatric dentistry appearing on the General Dental Council specialist register. Questionnaires were sent to all of these specialists and 115 (78%) responded.

## RESULTS

Scenario 1 described a 6-year-old boy with a distal occlusal cavity affecting less than half of the marginal ridge (*Table 1*). The child was not in pain. *Table 2* shows the treatment choices of the Japanese specialists and presents the answers obtained in the UK study<sup>4</sup> for comparison. For the most part, the two groups adopted similar treatment modalities, focusing in the main on the provision of traditional restorative treatment (Japan, 78.3%; UK, 71.0%). The only major difference was that a much higher percentage (10.3%) of UK specialists chose to undertake a vital pulpotomy with a stainless steel crown; only 0.9% of Japanese respondents chose this option.

In Scenario 2 (*Table 1*) the same patient presented with a larger distal occlusal cavity affecting more than half of the marginal ridge. Treatment choices differed markedly between the two groups (*Table 3*): 71.4% of UK specialists chose to undertake a pulpotomy followed by either a glass ionomer restoration (22.3%) or a stainless steel crown (49.1%), but only 3.8% and 12.3% of Japanese participants chose these respective

**Table 2** Treatment options for Scenario 1: responses given by Japanese and UK specialists in paediatric dentistry

Treatment option	Japan	UK
	( <i>n</i> = 104) Specialists, %	( <i>n</i> = 115) Specialists, %
No restorative treatment	0.0	0.0
Fluoride varnish application	1.9	1.9
Atraumatic restorative treatment	15.1	12.1
Traditional restorative treatment	78.3	71.0
Vital pulpotomy with glass ionomer/composite or amalgam	1.9	4.7
Vital pulpotomy with stainless steel crown	0.9	10.3
Extraction under local anaesthetic	0.0	0.0
Refer for extraction under sedation	0.0	0.0
Refer for extraction under general anaesthetic	0.0	0.0
NA	1.9	0.0

NA, data not available.

**Table 3** Treatment options for Scenario 2: responses given by Japanese and UK specialists in paediatric dentistry

Treatment option	Japan	UK
	( <i>n</i> = 104)	( <i>n</i> = 115)
	Specialists, %	Specialists, %
No restorative treatment	0.0	0.0
Fluoride varnish application	0.0	0.0
Atraumatic restorative treatment	9.4	4.5
Traditional restorative treatment	73.6	24.1
Vital pulpotomy with glass ionomer/composite or amalgam	3.8	22.3
Vital pulpotomy with stainless steel crown	12.3	49.1
Extraction under local anaesthetic	0.0	0.0
Refer for extraction under sedation	0.0	0.0
Refer for extraction under general anaesthetic	0.0	0.0
NA	0.9	0.0

NA, data not available.

**Table 4** Treatment options for Scenario 3: responses given by Japanese and UK specialists in paediatric dentistry

Treatment option	Japan	UK
	( <i>n</i> = 104)	( <i>n</i> = 115)
	Specialists, %	Specialists, %
No treatment	0.9	1.8
Fluoride varnish application	0.0	0.0
Atraumatic restorative treatment	0.0	0.0
Traditional restorative treatment	1.9	0.0
Open the pulp chamber and drain the tooth	54.7	3.6
Non-vital pulpotomy with glass ionomer/composite or amalgam	11.3	21.8
Non-vital pulpotomy with stainless steel crown	17.9	51.8
Prescribe antibiotics alone	0.0	1.8
Extraction under local anaesthetic	4.7	17.3
Refer for extraction under sedation	0.0	2.0
Refer for extraction under general anaesthetic	0.0	0.0
NA	8.5	0.0

NA, data not available.

options. The specialists from Japan preferred to apply traditional restorative care (73.6%).

The clinical problem was further developed in Scenario 3 (*Table 1*), in which the primary molar was non-vital and had a sinus. Just as in Scenario 2, the two groups of specialists diverged markedly in their treatment planning. *Table 4* shows that, once again, the majority (73.6%) of UK specialists opted for pulpotomy followed by a glass ionomer/amalgam restoration (21.8%) or a stainless steel crown (51.8%). Over half (54.7%) of the Japanese specialists favoured opening the pulp chamber to establish drainage, but some chose non-vital pulpotomy with glass ionomer/amalgam restoration (11.3%) or a stainless steel crown (17.9%).

**Table 5** Treatment options for Scenario 4: responses given by Japanese and UK specialists in paediatric dentistry

Treatment option	Japan	UK
	( <i>n</i> = 104)	( <i>n</i> = 115)
	Specialists, %	Specialists, %
Open the pulp chamber and drain the tooth	74.0	1.8
Excavate caries and place a sedative or a temporary dressing	4.8	0.0
Prescribe antibiotics alone	1.0	0.0
Prescribe analgesics alone	1.9	0.0
Prescribe both antibiotics and analgesics	9.6	3.6
Extraction under local anaesthetic	4.8	21.8
Do nothing immediately but refer for extraction under sedation	0.0	51.8
Do nothing immediately but refer for extraction under general anaesthetic	0.0	1.8
NA	3.8	0.0

NA, data not available.

The clinical problems increased in severity in Scenario 4, in which the molar was not only non-vital but the child was in pain (*Table 1*). It is clear from *Table 5* that very different clinical treatments would be undertaken in the two countries. The majority of Japanese specialists chose to open the pulp chamber and drain the tooth (74.0%), whereas most UK respondents favoured the extraction option (73.6%).

## DISCUSSION

Making cross-cultural comparisons can be fraught with difficulty as language barriers and social norms relating to completing questionnaires can make the process of information collection open to errors of interpretation<sup>8,9</sup>. However, in this particular study, the questionnaire was completed by a group of Japanese dentists who understood the rationale behind the case scenarios and had little difficulty recognising the clinical problems, which are common in Japan. It could be argued that differences in the ways in which the UK and Japanese participants were recruited may have affected the responses. In Japan, the specialist system for paediatric dentistry does not have an official agency that maintains a register as is the case in the UK. Therefore, the recruitment of Japanese specialists at a conference on children's dentistry was the most pragmatic way to proceed.

Children's dental care is largely free in Japan and completely free in the UK, but there are some differences in the way dentists are paid. The UK has adopted a capitation payment system, whereas in Japan the health insurance scheme is based on a fee-for-treatment contract, which may encourage a more interventional philosophy. However, research in the UK on capitation does not show that this payment system results in the

delivery of little restorative care to child patients<sup>10,11</sup>. Hence, as shown in our previous study, the differences in treatment planning between Japanese and UK dentists, such as in preferences for tooth extraction and choice of materials for restoration, are unlikely to reflect the way they are paid<sup>12</sup>. These differences may reflect patient preferences and easy accessibility.

Paediatric dentistry has a number of prestigious national and international journals, as well as regular conferences. It is therefore disappointing to find that two groups of specialists from countries with highly developed systems of dental care should approach clinical problems so differently. We do not suggest the treatment options chosen in either of the two countries were wrong, but, rather, that the variations in the treatments preferred were somewhat surprising. This study was confined to the primary molars because they are frequent sites of caries and the case scenarios depicted here represent day-to-day issues for all practising specialists.

It is clear that the aims of this comparative study have been met in that the results show the following:

- There are considerable differences in the way specialists in the discipline of paediatric dentistry from two different countries approach the treatment of a straightforward clinical issue
- The differences in treatment plans should galvanise paediatric dental researchers to investigate this issue in more detail.

One of the first societies dedicated to children's dental care, the American Academy of Paediatric Dentistry, in association with the American Dental Association<sup>13</sup>, recommends that children should have attended their first dental visit by the age of 12 months. This leads us to wonder what the differences in treatment planning would ultimately mean to the oral health status of individual children if this advice were to be adopted worldwide. The variations seen in the UK and Japan certainly indicate that more research is required to improve the evidence base in paediatric dental care<sup>14,15</sup>. Treatment recommendations will always have to take into account the needs of individual patients and should be tempered by clinical experience. However, the wide variations in standards of care seen in this comparative project suggest there is an ethical imperative to subject different interventions to randomised controlled trials in order to determine the most appropriate and cost-effective methods of care for the primary dentition.

## CONCLUSIONS

Japanese and UK specialists in paediatric dental care choose different interventions to treat the same clinical problems. Research is required to establish definitive answers on the most appropriate ways to restore the primary dentition to full functionality.

## Acknowledgements

We are grateful to the paediatric dental specialists working in Japan and the UK who participated in this survey.

## Conflicts of interest

None declared.

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