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Shortened dental arch therapy: views of consultants in restorative dentistry in the United Kingdom

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SUMMARY This paper reports the results of a study on the attitudes of the consultants in restorative dentistry (CRD) in the UK towards shortened dental arch therapy (SDAT). Data were collected by means of questionnaire, with a response of 67% achieved. The results indicate that 95% ($n = 87$) of the 91 participants in the study were of the opinion that SDA has a place in contemporary clinical practice. Eighty (88%) of the participants reported having prescribed SDA therapy during the last 5 years, the number of these patients requiring >5 units of crown and bridgework being typically less than 25%. Forty-

one (45%) of the participants reported patients being considered for SDAT expressing reservations about the outcome of their treatment, although around 75 (82%) of the participants indicated that SDAT was satisfactory in terms of oral function, comfort and well being. Experience of having to extend shortened dental arches following SDAT was limited to 34 (37%) of the participants. It is concluded that SDA is widely accepted but not widely practiced by CRDs in the UK and that, in patients satisfying existing criteria, the outcome of SDAT may be found to be acceptable in approximately 82% of cases.

Introduction

Recent surveys of adult dental health indicate that a greater proportion of adults are keeping their teeth later in life than ever before (Loe, 1987; Todd & Lader, 1990; Osterberg *et al.*, 1991). These studies also indicate that there is a high incidence of untreated dental disease in middle-aged adults. Drummond, Newton & Yemm (1988) have suggested that current techniques in restorative dentistry may need to be modified to meet the needs of elderly patients in years to come.

The traditional view that all missing teeth should be replaced has been challenged by workers such as Ramfjord (1974), who states that 'replacement of missing molar teeth is a common source of iatrogenic periodontal disease, and should be avoided if requirements for aesthetics and functional stability can be satisfied without such treatment'. Smith & Sheiham (1980) noted that older patients have different functional needs than younger patients and may not need treatment to provide

complete dentitions. In 1982, the WHO adopted as a goal for oral health 'the retention throughout life of a functional, aesthetic, natural dentition of not less than 20 teeth and not requiring a prosthesis'.

Considerations arising from the above led to the development of the shortened dental arch concept (SDA) by Kayser (1981, 1989). This concept involves directing treatment efforts at maintaining intact 'anterior and premolar dentitions' in both arches and avoiding complex restorative care in the molar region. Kayser believes that an intact 'anterior and premolar dentition' is adequate for oral function — a view supported by Witter *et al.* (1989) and Imperiali, Grunder & Lang (1984). Kayser suggests that shortened dental arch therapy (SDAT) may be appropriate for middle-aged and elderly adults with a history of poor dental health and for whom complex restorative dental care is contraindicated, either due to poor motivation or for financial reasons. Kayser *et al.* (1988) developed the 'problem oriented approach' as the guiding principal behind SDAT. Using this approach only

missing teeth that are causing, or are likely to give rise to problems are replaced, with all restorative efforts concentrated on the anterior and premolar teeth of both arches.

Possible advantages of SDAT include: (a) rationalized restorative care; (b) simplification of oral hygiene maintenance; (c) enhanced prognosis for remaining teeth; and (d) cost effectiveness as a health care measure.

To date, no data have been collected in relation to the dental profession's opinion of SDAT. This paper presents the findings of a survey of the attitudes of the consultants in restorative dentistry in the UK towards SDAT.

Materials and methods

A survey of the Consultants in Restorative Dentistry in the UK* was undertaken during 1993 to assess their attitudes towards SDAT and to investigate their experiences with this approach. Each Consultant ($n = 135$) was sent a copy of the study questionnaire together with a covering letter summarizing the principals of SDAT and describing the purpose of the study. Known non-respondents were sent up to two follow-up mailings.

In preparation, and prior to obtaining local Ethics Committee approval, the questionnaire was piloted and subsequently revised with the assistance of 10 selected UK Consultants in Restorative Dentistry.

The data collected were descriptive, obviating the need for any statistical analysis.

Results

A total of 100 responses were received, 91 of which were suitable for analysis. The remaining nine were returned uncompleted or with incomplete responses due to recent retirement or special circumstances in relation to clinical practice arrangements.

Concerning time since appointment as a Consultant, the answers ranged from 1 to 28 years with a mean of $11\text{y} \pm 7\text{y}$. Details of the respondents' main area of clinical practice are shown in Table 1. Regarding the attitudes of the respondents' towards SDAT there was no indication of this being influenced by the time since appointment as a Consultant, or by the main area of clinical practice.

When asked if they believed that SDAT had a place in

Table 1. Consultants in Restorative Dentistry—area of main clinical practice

Area of clinical practice	Number (%)
Comprehensive Restorative Dentistry	24 (26%)
Periodontics	25 (28%)
Prosthodontics	26 (29%)
Gerodontology	1 (1%)
Conservation/Endodontics	14 (15%)
Implantology	1 (1%)

Consultant-led services and in General Dental Practice, 95% of the responses were positive on both accounts. The reasons given for negative responses in this section of the questionnaire included: (1) the patient would be committed to complete dentures if SDAT were to fail; (2) attempts should be made to restore all 'saveable' teeth; (3) the ensuing drifting of teeth would lead to difficulties in controlling periodontal disease; (4) premolar teeth are unable to support the occlusion; and (5) SDAT is too simplistic.

Concerning the criteria for SDAT as postulated by Kayser (1989), 84% of Consultants indicated that they viewed them as appropriate. Modifications to these criteria suggested by the remaining respondents included: (1) the patient should have canine guidance; (2) the criteria should include ages between which SDAT may be appropriate; (3) evidence of reduced periodontal disease before SDAT is considered; (4) criteria to include consideration of appearance, arch shape and circumoral musculature; and (5) criteria to include consideration of previous restorative treatment, previous prosthetic experience and functional difficulties.

Seventy seven per cent of the respondents agreed with the 'problem-oriented approach' as described by Kayser *et al.* (1988). Those who disagreed with the approach gave as their reasons: (1) the approach is imprecise; (2) the approach does not include provision for treatment which may be necessary to prevent future problems; and (3) the approach is too simplistic, placing too much emphasis on the patients' wishes.

Turning to the prescription of SDAT, 63% of the respondents indicated 'on occasion' 25% 'frequently' and 12% 'never'.

Details of the number of patients treated by the Consultants by means of SDAT are set out in Table 2. The male:female ratio of these patients is approximately 1:1.

* Senior specialists practising within the U.K. Hospital Health Service and University Dental Schools.

Table 2. Number of patients treated by means of shortened dental arch therapy

Number of patients	N (%) of respondents
0	11 (12%)
<5	14 (15%)
6-10	27 (30%)
11-25	8 (9%)
26-50	10 (11%)
>50	12 (13%)
Not indicated	9 (10%)

Regarding patients expressing reservations about a treatment plan to leave them partially dentate, 45% of the respondents indicated that, in their experience, patients tended to express reservations that: (1) they may not be able to chew properly, with relatively few, if any, molar teeth; (2) their dental and, in some cases, facial attractiveness may remain compromised; and (3) failure to replace missing molar teeth may give rise to other problems both dentally and, in some cases, systemically.

In relation to the respondents' opinions regarding SDAT providing a satisfactory outcome in terms of oral function, oral comfort, dental appearance and dental well being, the findings are summarized in Table 3.

Concerning the need to prosthetically replace lost molar teeth in patients treated by means of SDAT, 37% of the respondents indicated experience of such an outcome. The findings relating to the percentage of the patients treated by the respondents requiring prosthetic restoration of their shortened dental arches is illustrated in Fig. 1.

Discussion

Analysis of the results, based upon a 67% response rate, suggest that the SDA concept finds widespread acceptance among Consultants in Restorative Dentistry in the U.K. Only 16% of the Consultants who participated in the study believed that the current criteria for SDAT should be amended, in particular, in relation to periodontal status which should be carefully considered prior to undertaking SDAT. As occlusal trauma in the presence of active periodontal disease is likely to accelerate periodontal breakdown (Lindhø, 1989), redefined periodontal criteria for SDAT should take account of occlusal factors.

Despite the widespread acceptance of SDA amongst the U.K. Consultants in Restorative Dentistry, >20% of the members of this group would appear to disagree with the 'problem-oriented approach'. Given the view of Kayser *et al.* (1988) that the 'problem-oriented approach' is the guiding principal behind SDAT, it is suggested that aspects of this key element of the SDA concept may warrant further investigation.

While most (88%) of the Consultants in Restorative Dentistry apply and prescribe SDAT, individual Consultants' experience of treating patients by means of SDAT would typically appear to be limited to small numbers of patients, with 53% of the respondents having indicated that they had treated less than 25 patients using SDAT in the last 5 years. Such experience is limited when compared with that of Witter *et al.* (1987, 1988, 1989, 1990, 1991) and this should be borne in mind when interpreting the findings of this study.

Of the U.K. Consultants in Restorative Dentistry who have treated patients by means of SDAT, the majority

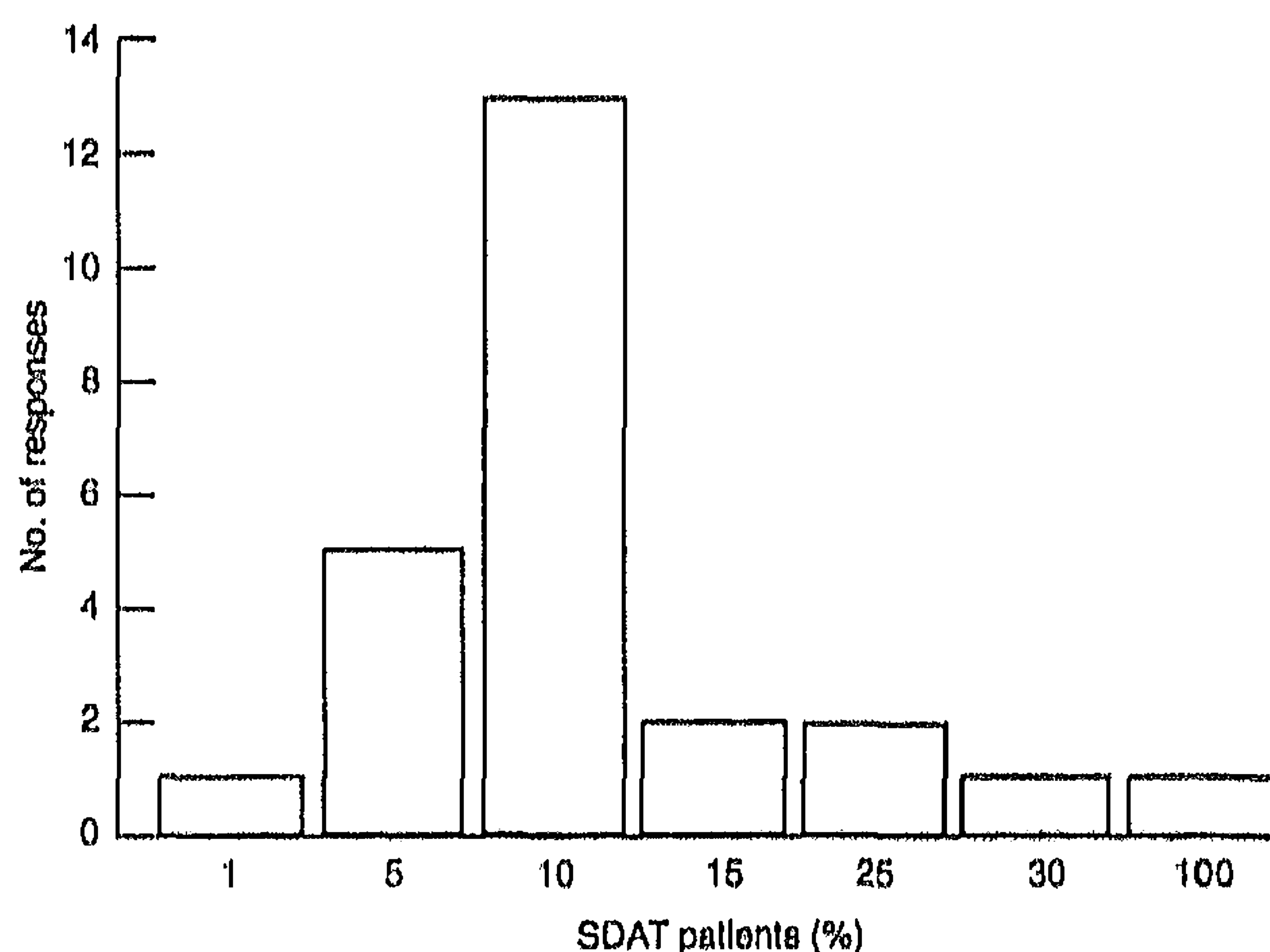
**Fig. 1.** Distribution of SDAT patients subsequently provided with a prosthesis.

Table 3. Outcome of shortened dental arch therapy

Feature	Satisfactory Outcome N(%) of respondents		
	Yes	No	Not indicated
Oral comfort	78(86%)	0(0%)	2(2%)
Oral function	79(87%)	0(0%)	1(1%)
Dental appearance	73(80%)	7(8%)	0(0%)
Dental well-being	75(82%)	1(1%)	4(4%)

(approximately 90%) would appear to be favourably disposed to this form of treatment, but only in highly selected patients in whom a more complete restoration of the dentition is contraindicated and satisfactory treatment in terms of oral comfort, oral function and well being may be achieved by directing treatment efforts at maintaining intact anterior and premolar dentitions.

As illustrated in Fig. 2, the proportion of patients requiring more than five units of crown and bridgework to complete SDAT undertaken by U.K. Consultants in Restorative Dentistry is typically less than 25%. Further work is indicated to investigate the cost effectiveness of the Consultants' SDAT, given the relatively limited extent of their intervention to complete treatment in patients who are assumed to have been referred or to present with substantial dental difficulties or medical problems which preclude treatment in the primary sector.

Linked to the above would be an investigation into the long-term survival rate for the dentitions maintained

by SDAT. Although extensive data on the benefits and in service performance of shortened dental arches have been published by Witter *et al.* (1994a,b), insufficient longitudinal data are available on the mode and rate of failure of SDAT. In the present study, 30 (35%) of the respondents who had treated patients by means of SDAT responded positively when asked to indicate as to whether prosthetic restoration of shortened dental arches was a common medium to long-term consequence of SDAT. However, by contrast, it could be viewed that the success associated with the avoidance of replacement of molar teeth in the majority of SDAT cases outweighs the consequences of failure in the minority of cases. Furthermore, assuming that provision is made to facilitate the prosthetic replacement of missing molar teeth in the provision of SDAT, the consequences of SDAT failure may be of limited clinical significance.

The studies by Aukes, Kayser & Felling (1988) and Kayser (1981) have indicated that SDAT fails to provide satisfactory function in 19–21% of patients treated in this way. These figures, coupled with those of the present study, indicate a relatively high failure rate for SDAT and reinforce the view that current criteria for SDAT may need to be extended to exclude patients in whom SDAT is likely to fail.

Conclusions

SDAT is widely accepted by Consultants in Restorative Dentistry in the U.K., but not widely practised by the

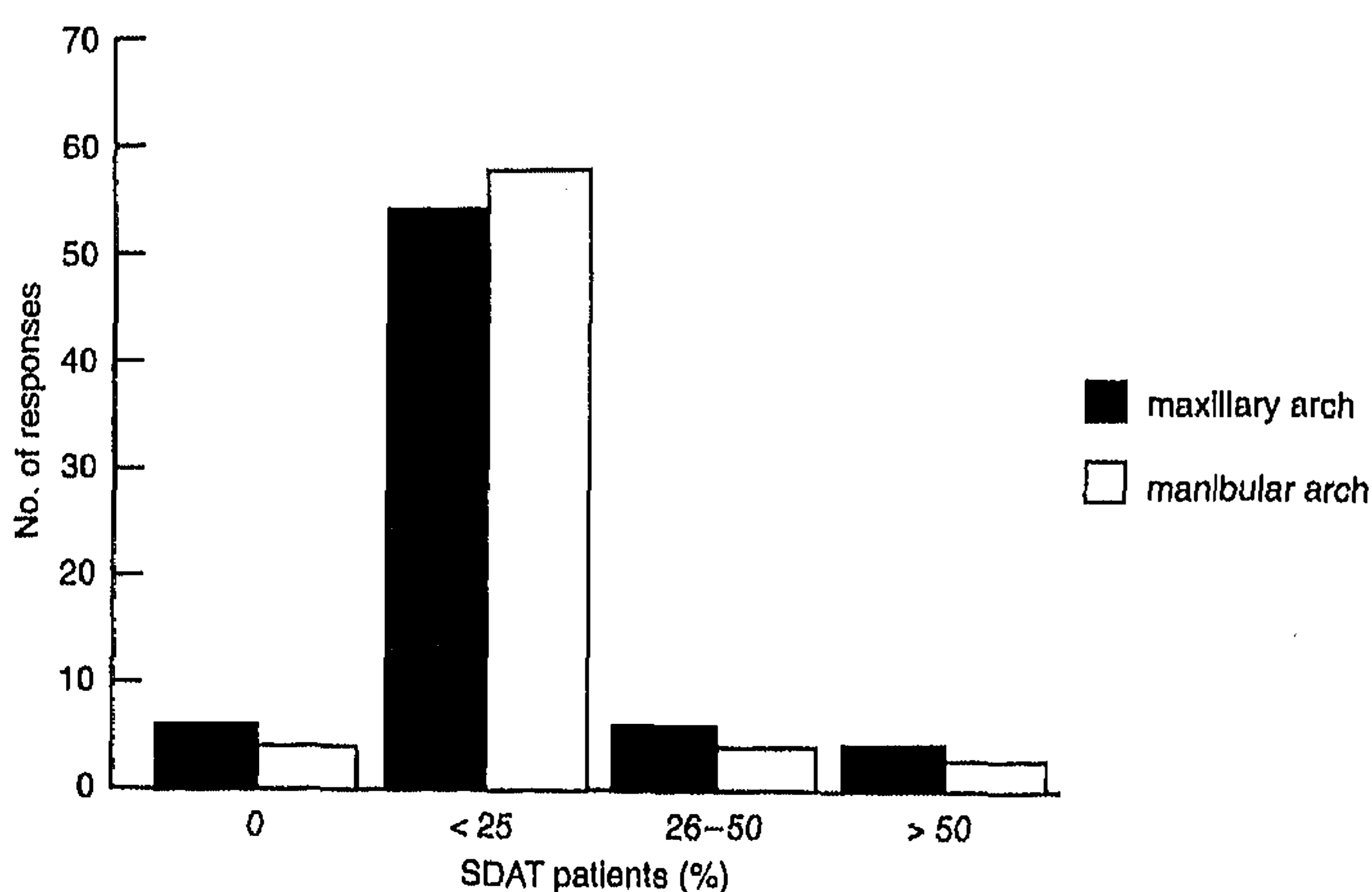


Fig. 2. Distribution of SDAT patients requiring >5 units of crown and bridgework.

members of this group. It is suggested that with refinement of the established criteria for SDAT and Kayser's 'problem-oriented approach', SDAT may gain further acceptance and be practised more widely within Consultant-led services in Restorative Dentistry in the U.K.

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