The BDA Weighted Case Mix Tool (WCMT): A Field Trial conducted in the Salaried Dental Services NHS Highland

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1.0 Executive Summary

1.1 The Remit

The Dental Health Services Research Unit (DHSRU) was invited by NHS Highland to undertake a field trial of the BDA Weighted Case Mix Tool (WCMT) to assess the patient case-mix of those attending NHS Highland salaried dental service in the South East CHP. The survey was conducted over a 3 month period (January to March) in 2008. It involved all salaried dentists working in the 9 salaried dental clinics within the South East region of NHS Highland. This work-stream represents the first field trial of the WCMT in Scotland.

1.2 Main Findings

1) Weighted case mix tool: patient complexity

Sixty-four percent of patients accessing the SE CHP salaried dental services had at least 1 management complexity. Twelve patients had extreme complexities. The majority of patients (293) with management complexities had co-operation difficulties (e.g. requiring longer appointment times). Smaller number had difficulties in access oral care (189) and medical status complexities (179). Patients with extreme management complexities had difficulties with communication, co-operation as well as oral risk factors and access issues. The majority of patients in all other age groups had some complexity (67% of 5-19 year olds; 53% of 20-64 year olds and 62% of those aged 65 years and over). Two percent of patients in the 20-64 years age group and the 65 years and over were classified as having extreme complexities. Irrespective of age group oral risk factors were the most common patient management complexity

2) Periodontal Health

Twenty percent of the sample was plaque free. Of the 718 (80%) cases with plaque 448 (62%) had an average plaque score of less than or equal to 1 while 48 (7%) had a score greater than 2 but less than or equal to 3. Only 4% (22) had a BPE score of 0. Of the remaining 477 participants 42% (200) had BPE = 2 as their highest overall score, followed by a BPE of 3 (27%). A highest scores of 4 and * were recorded in 10% (45) and

3% (n= 14) of these cases respectively. Patients with greater management complexities had greater mean plaque scores and greater experience of periodontal disease.

3) Obvious Decay Experience

Sixteen percent (158) of patients attending the salaried dental service in SE CHP between January and March 2008 had no obvious decay experience. Of those with obvious decay experience 59% (491) had decayed teeth (ranging from 1 to 19 decayed teeth): 75% (620) had filled teeth (ranging from 1 to 26 filled teeth), 66% (544) had missing teeth (ranging from 1 missing tooth to being edentulous). Patients with management complexities had greater numbers of decayed, missing and filled teeth compared with 'standard patients'.

4) Oral Pathology

Forty patients had an oral pathology. Of these 75% belonged to the complex patient group.

5) Patient Complexity and Clinic Profile

In some clinics such as Aviemore the proportions of patients with complexities were low compared to clinics such as Newcraigs or RNI. In fact 4 of the 9 clinics routinely treated more than 75% complex patients and 2 of these clinics routinely treated patients with multiple complexities. This suggested that the salaried dental service in SE CHP was a specialised service with regards to the treatment of patients with management complexities.

6) Characterising the Type of Patient Accessing the Salaried Dental Services in SE CHP

It is therefore possible to characterise the type of patient who accesses the salaried dental services in the SE CHP. They tend to have patient management complexities and have poorer oral health status.

1.3 Conculsions

This field trial demonstrated the diversity of the case-mix and patient profile of people who access NHS Highland salaried dental services in the SE CHP. The majority of the clinics treated individuals with varying degrees of behavioural and/or management complexities. Since this represents at least 50% of clinical time it may be suggested that the salaried dental service in the SE CHP requires greater time and clinical resources to treat and care for the diversity and complexity of their patient case-load.

2 Background

The Dental Health Services Research Unit (DHSRU) was invited by NHS Highland to undertake a field trial of the BDA Weighted Case Mix Tool (WCMT) to assess the patient case-mix of those attending NHS Highland salaried dental service in the South East CHP. The survey was conducted over a 3 month period (January to March) in 2008. It involved the all salaried dentists working in the 9 salaried dental clinics within the South East region of NHS Highland. This work-stream represents the first field trial of the WCMT in Scotland.

2.1 Highland Salaried Dental Service

Since 2000, NHS Highland has provided a salaried dental service to address its population's access difficulties as a consequence of the progressive privatisation of general dental services in the Highland region. NHS Highland did this by remodelling its original community dental service structure (that is: the old schools' dental service, special care dental service and dental services for the elderly) into a salaried dental service providing NHS dental care for the growing number of NHS patients unable to access private dental care. This change in service provision, thus aimed to widen accessibility to all NHS Highland dental patients. The salaried service still catered for the original community based case-mix of more complex patient groups who required time-consuming behavioural and treatment management. Anecdotal reports suggested that the patients being seen by the new NHS salaried dental services were more complex but what remained unknown was the true case-mix of the patient load with regard to complexity of treatment and management. It was therefore important to assess the caseload of patients attending salaried dental services in NHS Highland in order to demonstrate this unique mixture of patient complexity particularly in light of further demands upon the service. It was necessary to find an objective means of assessing patient complexity in order to undertake this audit. The Weighted Case Mix Tool (WCMT) developed by Bateman and colleagues [1] on behalf of the British Dental Association is a valid and reliable measure of patient profile. Hence the remit of this work-stream was to characterise the types of patient attending the salaried dental service in the South East CHP, NHS Highland using the WCMT.

2.2 The Weighted Case Mix Tool (WCMT)

The British Dental Association's WCMT was developed by Bateman and colleagues as part of the evolution of a 'tool kit' for the commissioning of special care dentistry in the Primary Care Trusts as first proposed by the British Society for Oral Health and Disability [2]. The WCMT has described patient complexity in 25 salaried dental services in England and Wales [1]. The tool identifies 6 criteria that solely or in combination, indicates a measurable level of patient complexity (Table 1)

Table 1: Assigned Weightings for Criteria

	0	**A**	**B**	**C**
Ability to communicate e.g. hearing impairment	0	2	4	8
Ability to co-operate e.g. DGA required	0	3	6	12
Medical status e.g. unstable diabetes	0	2	6	12
Oral risk factors e.g. OH compromised	0	3	6	12
Access to oral care e.g. domiciliary care required	0	2	4	8
Legal and ethical barriers to care e.g. children in foster care	0	2	4	8

Each criteria is measured on a four point scale where 0 represents an average fit and well individual (standard patient) and A, B and C demonstrate increasing levels of management complexity (Table 1). Although there is a level of subjectivity in assessing the scores, the tool is supported with a best guide model to aid appropriate scoring. Each score is '*assigned weightings based upon a group of experienced clinicians*' in the BDA development group (Appendix 1). A weighted total score is calculated from the sum of the 6 individual criteria. The total weighted case-mix score is allocated into a series of banded scores reflecting the degree of patient management complexity (Table 2).

Table 2: Banded Total Score

0	Standard patient
1-9	Some complexity
10-19	Moderate complexity
20-29	Severe complexity
30+	Extreme complexity

3 METHODS

3.1 The Sample

There are 9 clinics in the SE CHP. They all participated in the field trial. These clinics included 1 mobile clinic, 6 clinics located in and around the city of Inverness; 1 in Aviemore and 1 in Nairn. All 17 dentists in South East CHP NHS Highland (SE CHP) were invited to participate in the survey. All patients attending the salaried dental clinics in the 3 month period were assessed using the WCMT as part of their routine dental health care.

3.2 The Data Collection Form

The data collection form was in 4 sections which inquired about the dentist's characteristics including location of surgery: patient demography including post code of residence: the WCMT and a clinical examination:

3.2.1 Dentist Details

This section was composed of four data entry areas: the dentist's code; year of graduation; gender and surgery location.

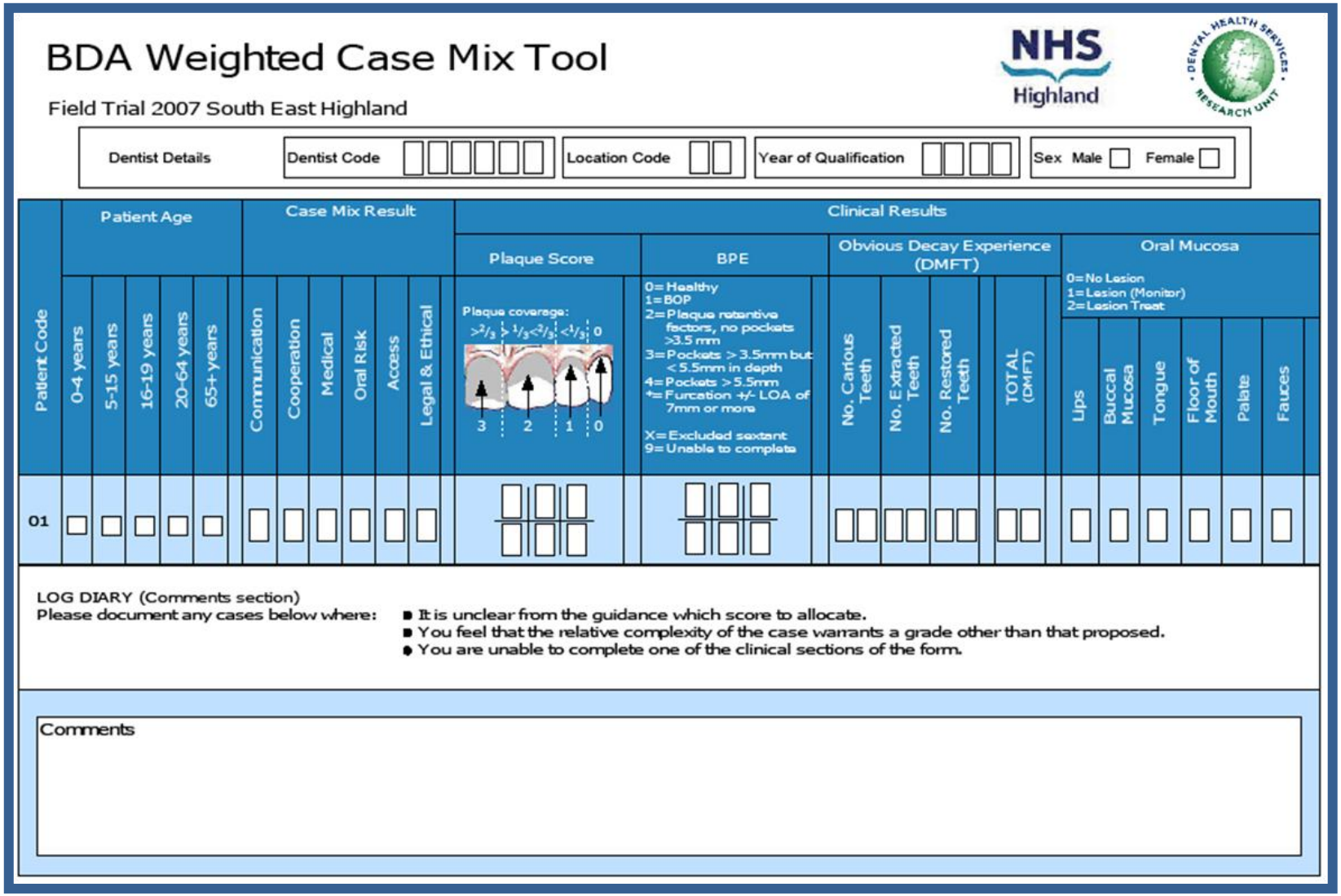
3.2.2 Patient Age

Patient age was recorded as prescribed by the original BDA WCMT data collection form with the addition of the 16-19 year olds age group (this was to aid appropriate recording of the Basic Periodontal Examination [BPE]).

3.2.3 Weighted Case Mix Scores

Weighted case mix scores were entered under each of the six categories as per the WCMT BDA good practice guidelines: patients were scored 0, A, B or C as appropriate. If for any reason they were unable to complete a section of the form, were unclear about what score to allocate in the WCMT or feel that the relative complexity of a case warranted a WCMT score other than that proposed in the guidance, then a comments section at the foot of the page allowed variance recording. Dental teams were also instructed to record each patient's postcode (Figure 1).

Figure 1: **The Highland WCMT Data Entry Form**



BDA Weighted Case Mix Tool

Field Trial 2007 South East Highland

NHS Highland

Dentist Details | Dentist Code | Location Code | Year of Qualification | Sex Male ☐ Female ☐

Patient Code	Patient Age					Case Mix Result						Clinical Results											
												Plaque Score	BPE	Obvious Decay Experience (DMFT)				Oral Mucosa					
	0-4 years	5-15 years	16-19 years	20-64 years	65+ years	Communication	Cooperation	Medical	Oral Risk	Access	Legal & Ethical	Plaque coverage: >2/3 > 1/3<2/3 <1/3 0 (3 2 1 0)	0=Healthy 1=BOP 2=Plaque retentive factors, no pockets >3.5 mm 3=Pockets > 3.5mm but < 5.5mm in depth 4=Pockets > 5.5mm *=Furcation +/- LOA of 7mm or more X=Excluded sextant 9=Unable to complete	No. Carious Teeth	No. Extracted Teeth	No. Restored Teeth	TOTAL (DMFT)	0=No Lesion 1=Lesion (Monitor) 2=Lesion Treat					
																		Lips	Buccal Mucosa	Tongue	Floor of Mouth	Palate	Fauces
01	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			☐☐	☐☐	☐☐	☐☐	☐	☐	☐	☐	☐	☐

LOG DIARY (Comments section)
Please document any cases below where:

- It is unclear from the guidance which score to allocate.
- You feel that the relative complexity of the case warrants a grade other than that proposed.
- You are unable to complete one of the clinical sections of the form.

Comments

3.3.4 Clinical Examination

- Periodontal Health: Plaque Score [3]

A score per index tooth, FDI notation 16 (buccal), 11 (labial), 26 (buccal), 36 (lingual), 31 (labial) and 46 (lingual), was allocated according to the Simplified Oral Hygiene Index (OHI-S) scale of debris present.

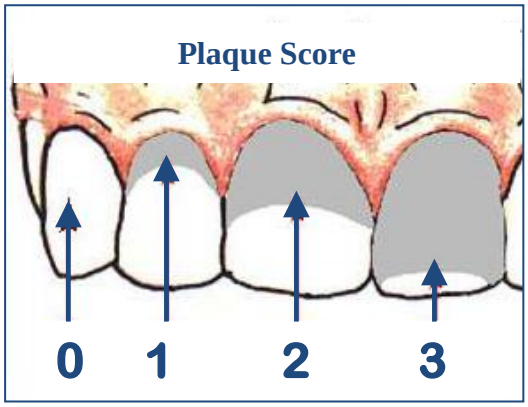
Figure 2: **The Simplified Oral Hygiene Index**

0= No debris or stain present

1= Soft debris covering not more than 1/3 of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered

2= Soft debris covering more than 1/3, but not more than two thirds, of exposed tooth surface.

3= Soft debris covering more than two thirds of the exposed tooth surface.



- Periodontal Health: Basic Periodontal Examination (BPE) [4,5]

As BPE was already part of current salaried practice this index was incorporated into the WCMT data collection form as a means of assessing periodontal health. A score per sextant was recorded for all patients aged 20 years and over, while for those aged 16-19 years index teeth FDI notation 16, 11, 26, 36, 31 and 46, were only scored. Patients under the age of 16 years were exempt from the BPE (Table 3).

Table 3 **BPE Codes**

BPE Code	Description
0	Healthy
1	Bleeding on probing
2	Plaque retentive factors, no pockets greater than 3.5mm
3	Pockets greater than 3.5mm but not smaller than 5.5mm
4	Pockets greater than 5.5mm
*	Loss of attachment at any one site is 7mm or more or if furcation is probed

- Obvious Decay Experience (DMFT) [6,7]

Obvious decay experience (DMFT) was assessed for each patient using the criteria and guidelines in accordance with the Basic Inspection from the National Dental Inspection Programme [6]. The Basic Inspection involves a simple assessment of the caries status of each patient. The number of teeth with carious lesions was recorded [D_3]; the number of teeth extracted [M] and the number of teeth with fillings or crowns [F]. The sum of these three figures formed the total DMFT value.

- Oral Mucosa

A score was allocated per intra-oral mucosal site regarding lesion presence or absence.

- Comments Area

A separate comments area was also provided to allow the dentists to record any variance in score allocation or any relevant clinical notes e.g. reason for referral etc. Patient's postcode was also recorded

3.3 WCMT Training

In September 2007, Peter Bateman conducted a 'Training the Trainers' Workshop' for NHS Highland (Appendix 2). During the workshop he introduced the WCMT; explained the various aspects of the WCMT; the use of the data capture form and the use of clinical scenarios (Appendix 3) as a means of ensuring inter-examiner fidelity.

RB (NHS Highland) and JH (DHSRU) used the BDA-WCMT training package (Appendix 2) to introduce the WCMT to the dentists taking part in the field trial on two separate days (December 5th and 7th 2007), to allow all salaried dentists within the SE CHP area to attend. At the end of the didactic training, the dentists were presented with clinical scenarios e.g. the care of a dentally anxious patient (Appendix 3). The dentists were given the opportunity to allocate a WCMT score for each of the clinical vignettes.

Following the training workshop and dentist feedback, the data capture forms were modified in accordance to the requirements of the salaried dental service.

3.4 Clinical Examination Training

All of the participating dentists had been previously trained in the use of the Basic Periodontal Examination (BPE) and plaque index. These were used in their routine dental practice in their clinics in the SE CHP.

All participating dentists were provided with the Basic Inspection Standardisation Exercise (Appendix 4). RB and JH conducted the Basic Inspection Standardisation Exercise which included the use of the NDIP basic standardisation pack. This consisted of the recognition of sound teeth and the assessment of dental caries at the visual level.

3.5 Procedure

The field trial started in January 2008 once all participating dentists had attended the two training days. Each patient attending the 9 dental clinics during this period were informed of the field trial and invited to participate. Consent was obtained. No patients refused to participate. A WCMT data capture form was completed for each patient during the 3 month period until 1,000 patients had been assessed. The forms were collected together on a weekly basis and sent to DHSRU for coding, data entry and statistical analysis.

3.6 Statistical analysis

The data was analysed using SPSS version 16. It was subjected to frequency distributions, chi-squared analysis, ANOVA and logistic regression analysis.

4 RESULTS

4.1 Demographic Profile

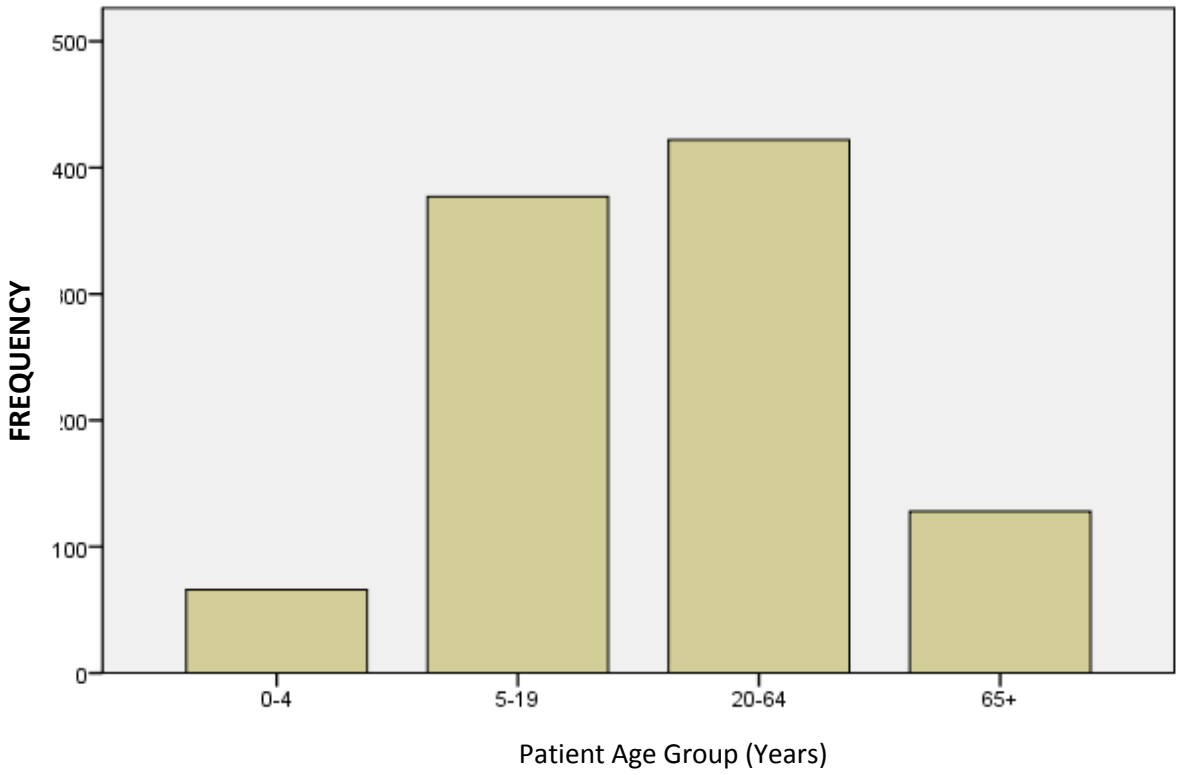
4.1.1 Participating Dentist Profile

Seventeen dentists (13 female and 4 male) were involved in the WCMT study. The dentists' year of graduation ranged from 1972 to 2006. The mean number of years since graduation was 14.07 (95%CI: 13.65, 14.49).

4.1.2 Participating Patient Profile

One thousand WCMT data entry forms were completed over the 3 month data gathering process. Of the patients attending the salaried dental clinics in the duration of the study, 7% were aged 4 years or under, 38% were aged 5 to 19 years (of which no patients were aged 16 to 19 years), 42% fell into the 20 to 64 year old age group category and 13% were aged 65 years and over.

Figure 3: **Patient Age Profile**

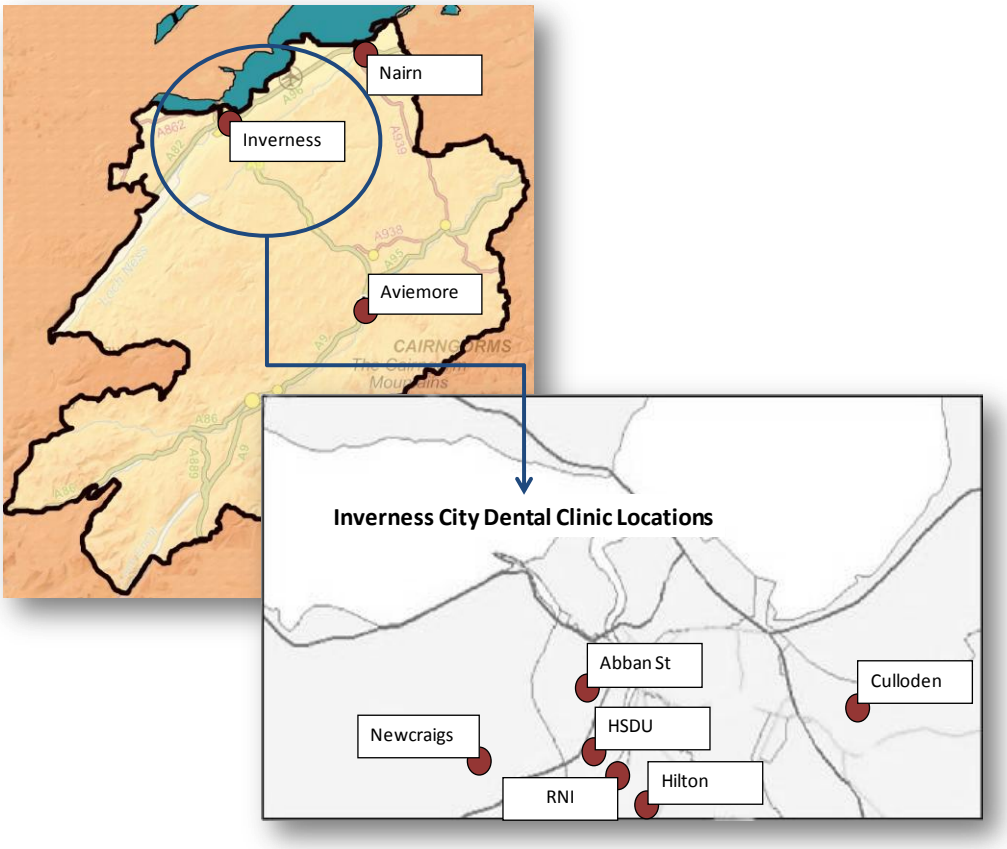


4.1.3 Salaried Dental Clinics: Geographic Location

Nine clinics including a mobile clinic participated in the field trial. Five of the 17 participating dentists worked in more than one clinic within the SE CHP area. Of the 17 dentists participating in this study: 3 worked at the Abban Dental Street clinic; 7 at the Culloden clinic; 2 at the Hilton Clinic; 3 at the High School Dental Unit (HSDU); 2 at the Royal Northern Infirmary (RNI); 1 worked in Newcraigs clinic; 2 at the Millbank dental clinic in Nairn; 1 in the Aviemore Dental Clinic and 3 dentists worked from the mobile dental clinic during the 3 month field trial.

Figure 4 shows the location of the salaried dental clinics within the SE CHP area. Of the 8 static clinics participating, 2 were located more than 10 miles from Inverness city centre (Nairn and Aviemore), 1 is located on the outskirts of Inverness (Culloden) and remaining clinics are within the city boundary. The final clinic (the mobile dental clinic) has no static location.

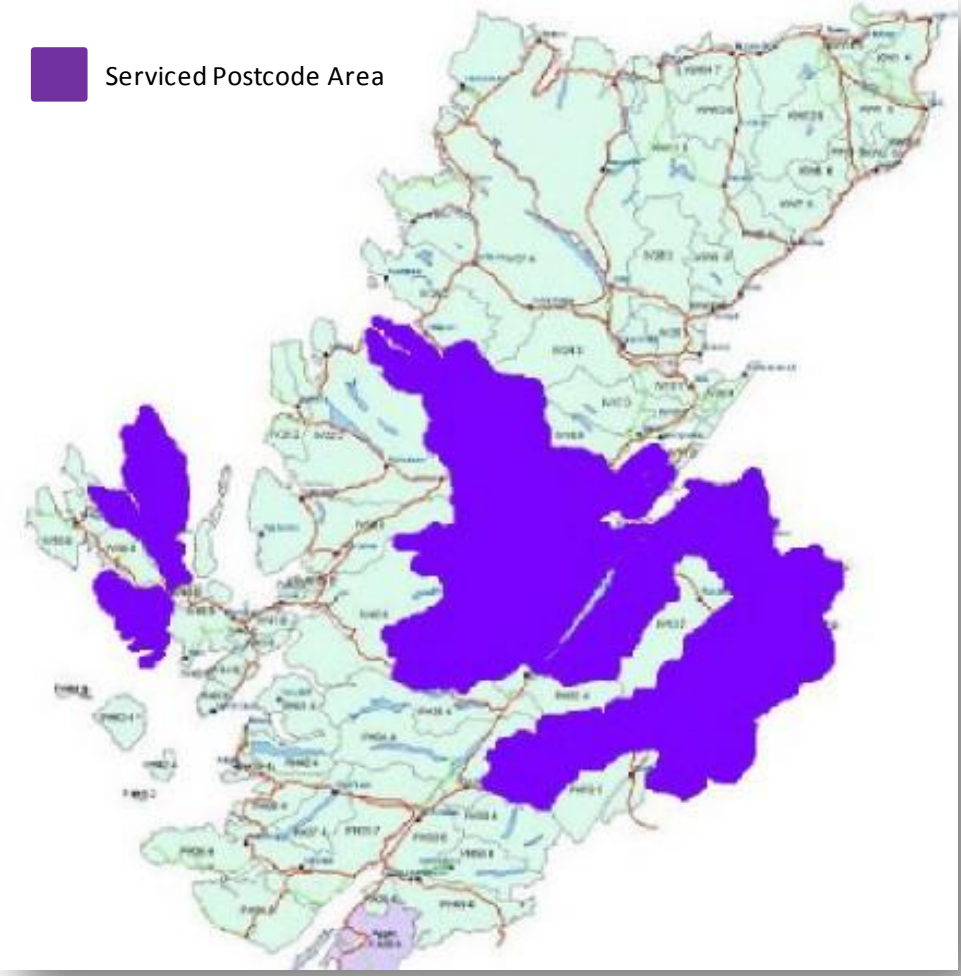
Figure 4: Clinic Locations



4.1.4 Clinic Catchment Area

Of the 1000 cases recorded, 376 had valid patient postcode entries. Figure 5 shows the postcode areas recorded by the nine clinics during the 3 month period. This distribution shows that patients living as far away as the Isle of Skye access salaried dental clinics in SE CHP.

Figure 5: Patient Postcode Areas Accessing Salaried Dental Practices in SE CHP

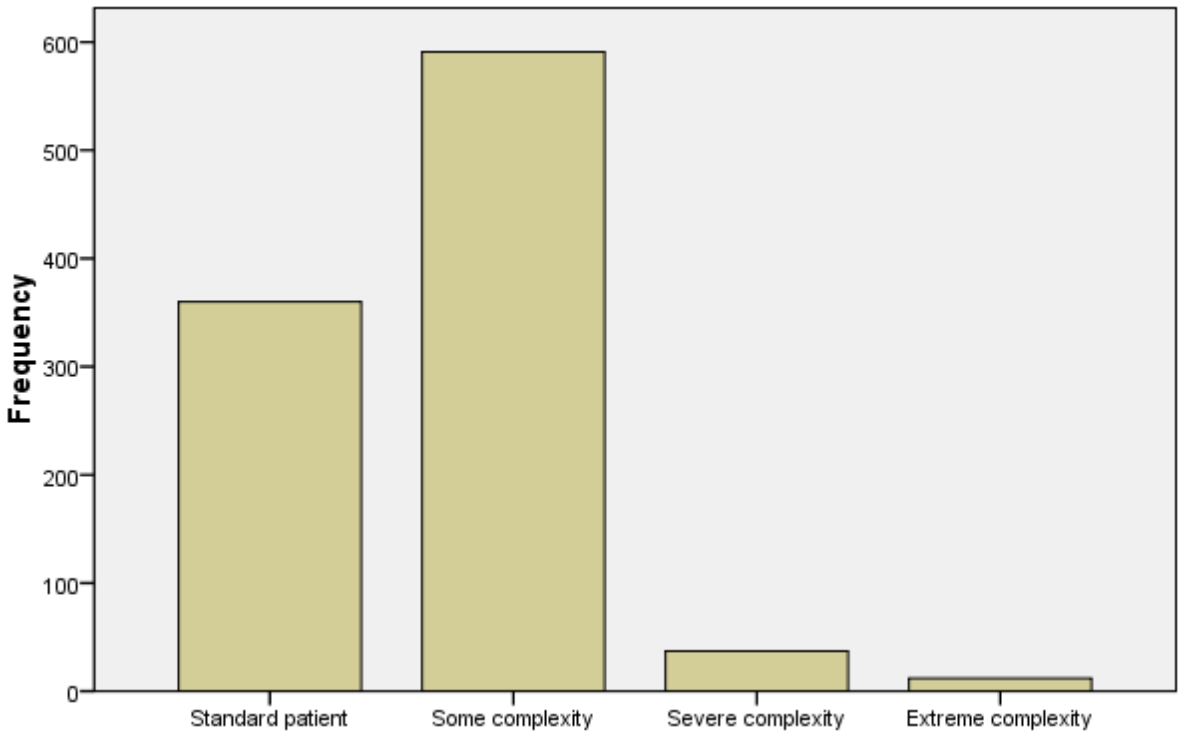


4.2 Weighted Case Mix Tool

4.2.1 Total WCMT: Patient Complexity Profile

Figure 6 illustrates the distribution of WCMT patient management complexity. The WCMT score for patients attending salaried dental clinics in the SE CHP ranged from 0 to 48. This reflected a wide spectrum of complexities or difficulties ranging from those with no problems 'standard patients' (n= 360), to those with extreme complexity (n= 12). Sixty-four percent (640) of the patients attending the SE CHP clinics had at least 1 complexity. In total, 640 cases recorded during the study period were deemed not to be 'standard patients' but to have complexity (ranging from some complexity through to extreme). It should be noted that no patients were recorded as having moderate complexity during the survey.

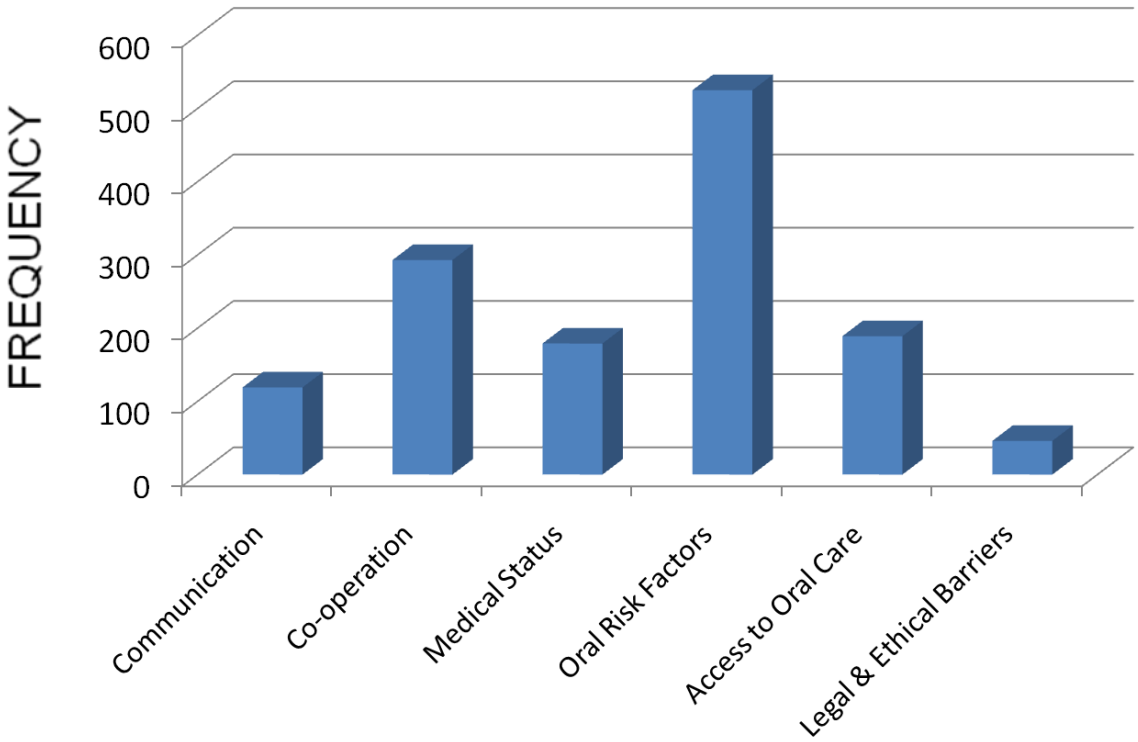
Figure 6: Total WCMT: Patient Complexity Profile



4.2.2 Total WCMT: Individual Components of Patient Complexity[1]

Of the 640 patients recorded to have complexities, the most common complexity was oral risk factors with 525 patients falling within this category. This was followed by co-operation difficulties (n= 293), access to oral care (n= 189) and medical status complexities (n= 179). Fewer patients were assessed to have communication (n= 119) or legal and ethical barriers (n= 46).

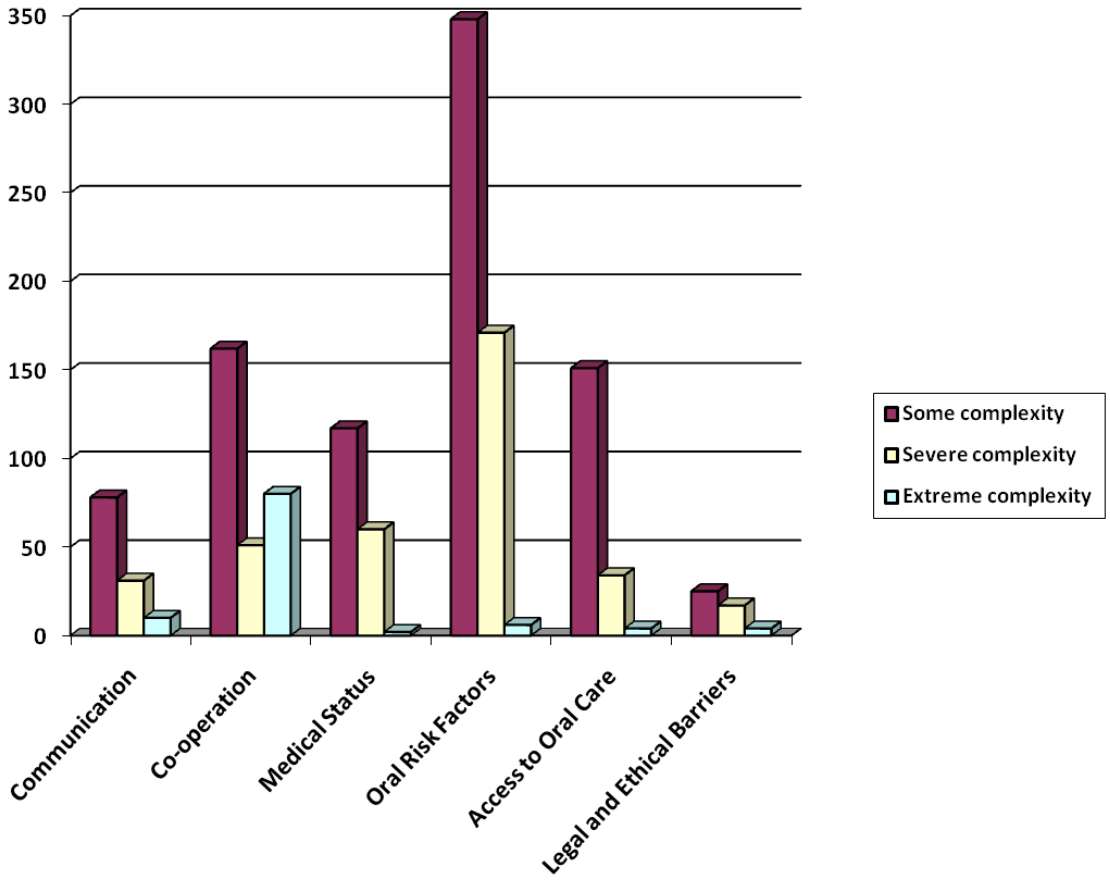
Figure 7: Total Patient Complexity Components



In terms of the range of complexity within each WCMT criteria group, Figure 8 demonstrates that individuals with extreme complexity tended to have co-operation difficulties (n= 80) and/or problems in communication (n= 10) while those with severe complexity tend to have oral risk factors (n= 171) and/or medical status issues (n= 60). Patients that fell within the lowest complexity category (some complexity) tended to have oral risk factors (n= 348) and/or co-operation problems (n= 162) (Figure 8).

[1] It should be noted that many patients exhibited more than one complexity.

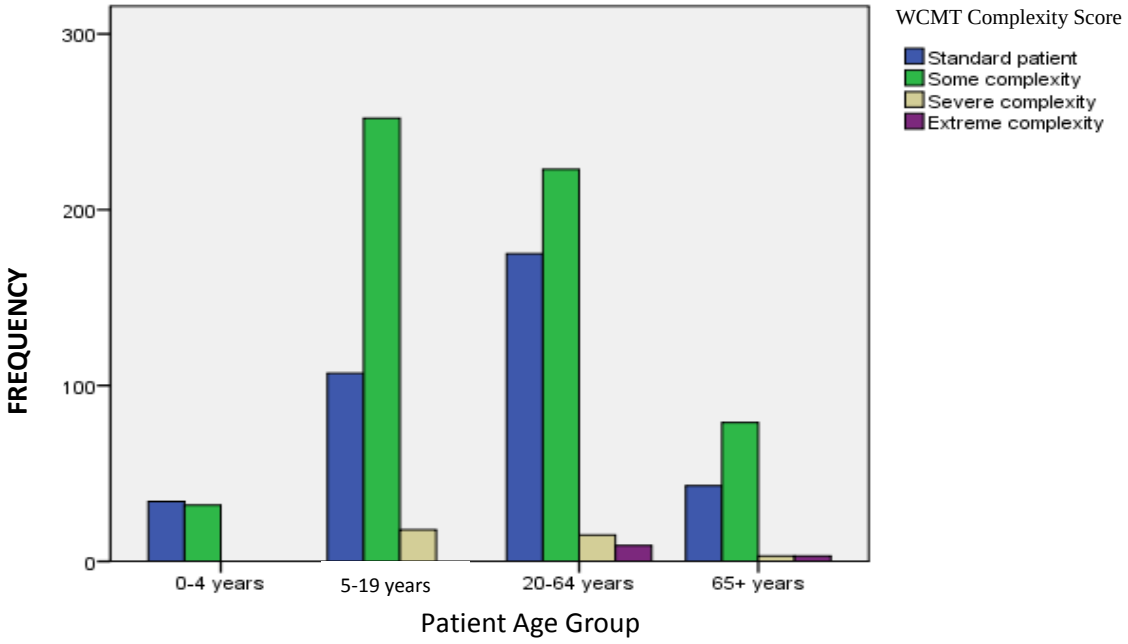
Figure 8: Distribution of WCMT Complexity Components



4.2.3 Total WCMT: Age Group

Patients in the youngest age category had less complexity compared to older patients. Half of the 0-4 year age group were classified as having some complexity. No individuals in the youngest age group (0-4 years) fell into the severe or extreme categories. The majority of patients in all other age groups had some complexity (67% of 5-19 year olds; 53% of 20-64 year olds and 62% of those aged 65 years and over). Two percent of patients in the 20-64 years age group and the 65 years and over were classified as having extreme complexities (Figure 9).

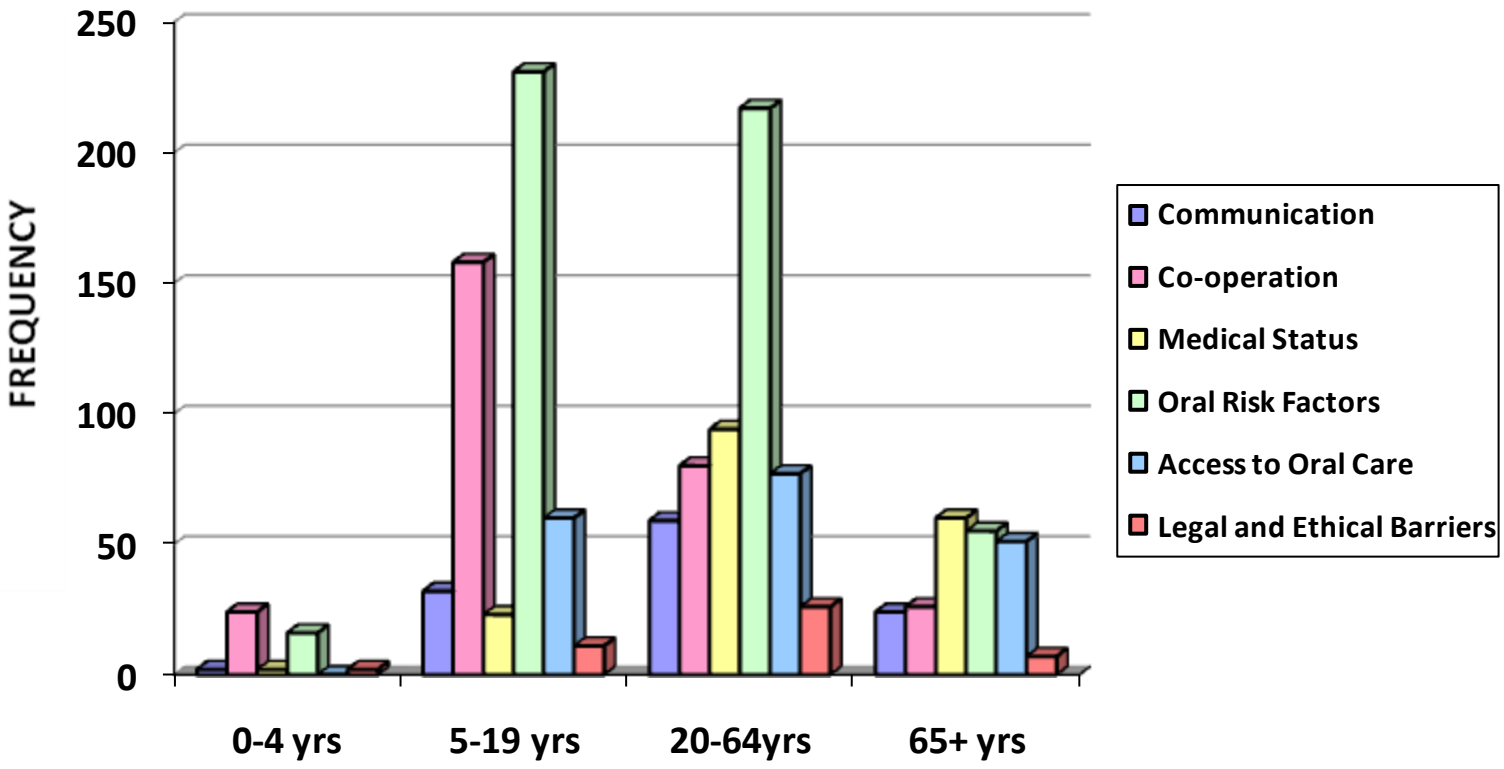
Figure 9: Total Patient Complexity by Age Group



4.2.4 Total WCMT: Individual Components of Patient Complexity by Age Group

The 640 patients recorded to have some form of complexity were then considered in relation to their age group and components of complexity. Of those patients within the 0-4 years age group the over a third (36%) had co-operation complexities of this age group exhibiting this component, followed by 24% (16) with oral risk factors. In the 5 to 19 year old group the main complexity was oral risk factors (61%) followed by co-operation difficulties (42%). Fifty-one percent (217) of 20-64 year olds exhibited oral risk factors while 47% (60) of those in the oldest age group exhibited difficulties relating to their medical status, closely followed by oral risk factors (55) and access to oral care (51).

Figure 10: Distribution of WCMT Complexity Components by Age Group

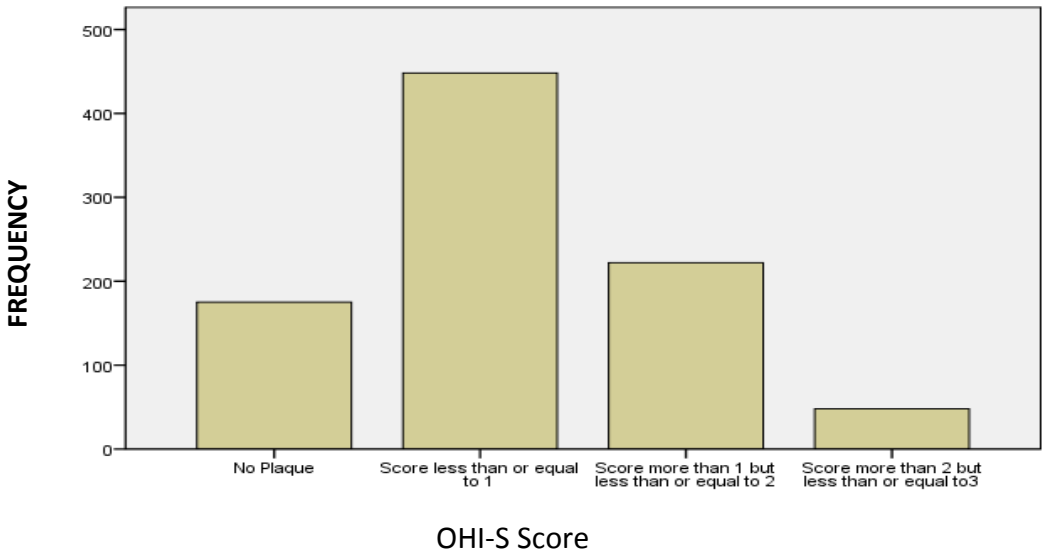


4.3 Clinical Examination

4.3.1 Periodontal Health: Plaque Score

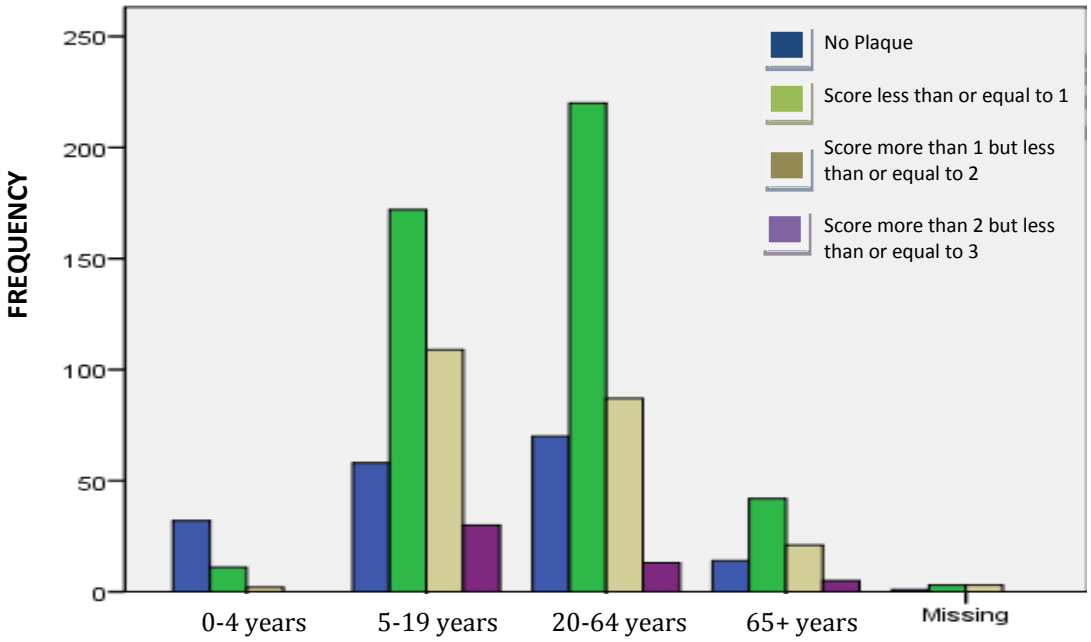
The plaque scores per sextant were recorded and divided by the total number of surfaces examined. Of the 893 valid recordings, 175 (20%) cases were plaque free. Of the 718 (80%) cases with plaque 448 (62%) had an average plaque score of less than or equal to 1, 222 (31%) had a score of more than 1 but less than or equal to 2; while 48 (7%) had a score greater than 2 but less than or equal to 3 (Figure 11).

Figure 11: Total Plaque Distribution



When the plaque scores were considered by age group, the majority of individuals aged 5 years and over had an OHI-S score of 1 or less with 47% (n= 172) of 5-19 year old, 56% (n= 220)of 20-64 year olds and 51% (n= 42) of those aged 65 years and over, falling into this category. The majority of the 0-4 year olds (71%) had no plaque deposits. When considering the highest OHI-S score 8% of the 5-19 year olds, 3% of 20-64 year olds and 6% of the 65 years and over age group fell into this category. Of the 893 patients with valid OHI-S scores, 7 had missing age group values (Figure 12).

Figure 12: Plaque Score by Age Group

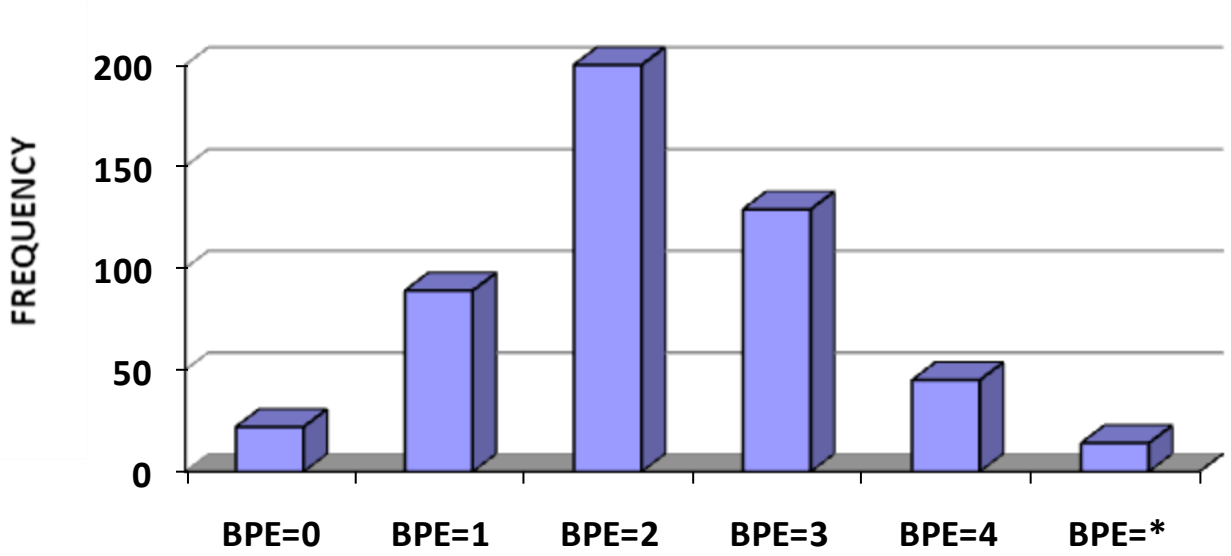


4.3.2 Periodontal Health: Basic Periodontal Examination (BPE)

Of the 1000 possible patients, 443 were deemed too young to have the BPE recorded while of those old enough to have this score recorded, 499 had valid results. For those patients aged 16 to 19 years coding of individual index teeth for BPE was performed while those aged 20 years and over had a full BPE recorded. The largest BPE score per patient was recorded and the overall distribution can be seen in Figure 13.

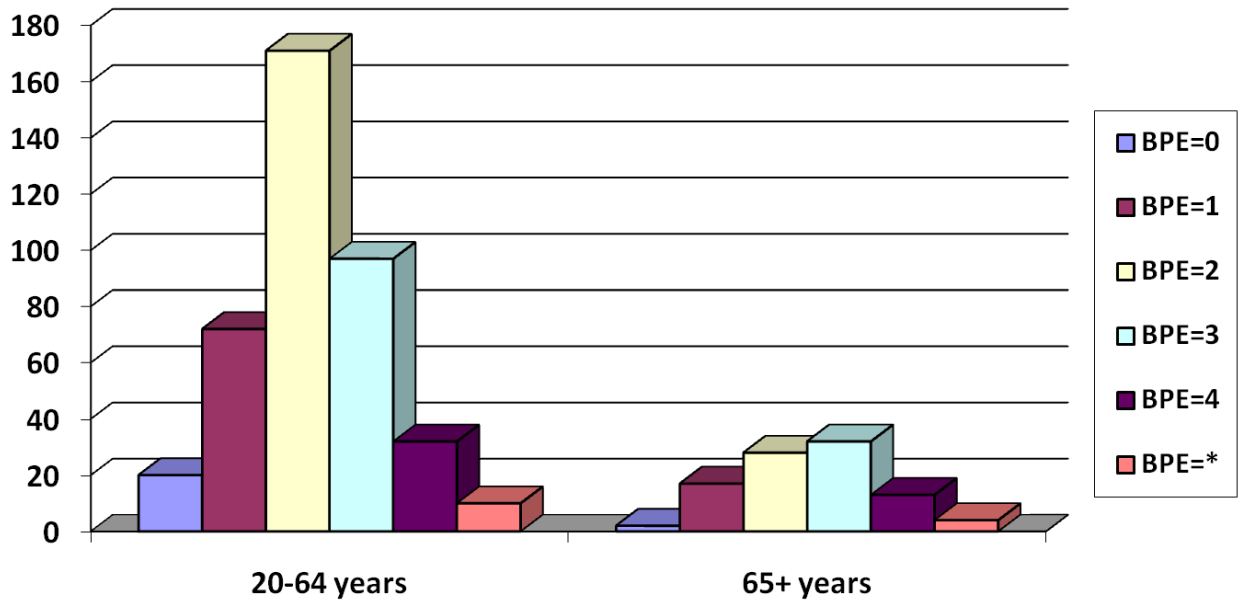
Of the 499 with valid BPE scores, only 4% (22) had a BPE score of 0, leaving 96% (477) with some degree of periodontal disease. Of the 477 within this category 42% (200) had BPE = 2 as their highest overall score, followed by a BPE of 3 (27%). An overall highest BPE score of 1 was recorded for 19% (89) of patients while the highest scores of 4 and * were recorded in 10% (45) and 3% (n= 14) of these cases respectively.

Figure 13: Distribution of BPE Scores



All patients therefore with a valid score had had a full BPE recorded and were 20 years or over in age. Figure 14 shows the BPE highest code distribution in association with the 20 to 64 year olds and the 65 and over age group. The majority of those in the 65 year old and over age group had a BPE of 3 (25%, n=32) while the majority of younger patients had a highest BPE score of 2 (40%, n= 171).

Figure 14: Distribution of BPE Scores by Age Group[2]



[2] No patients were aged 16-19 years therefore a modified BPE on index teeth only had not been recorded.

4.3.3 Obvious decay experience (DMFT)

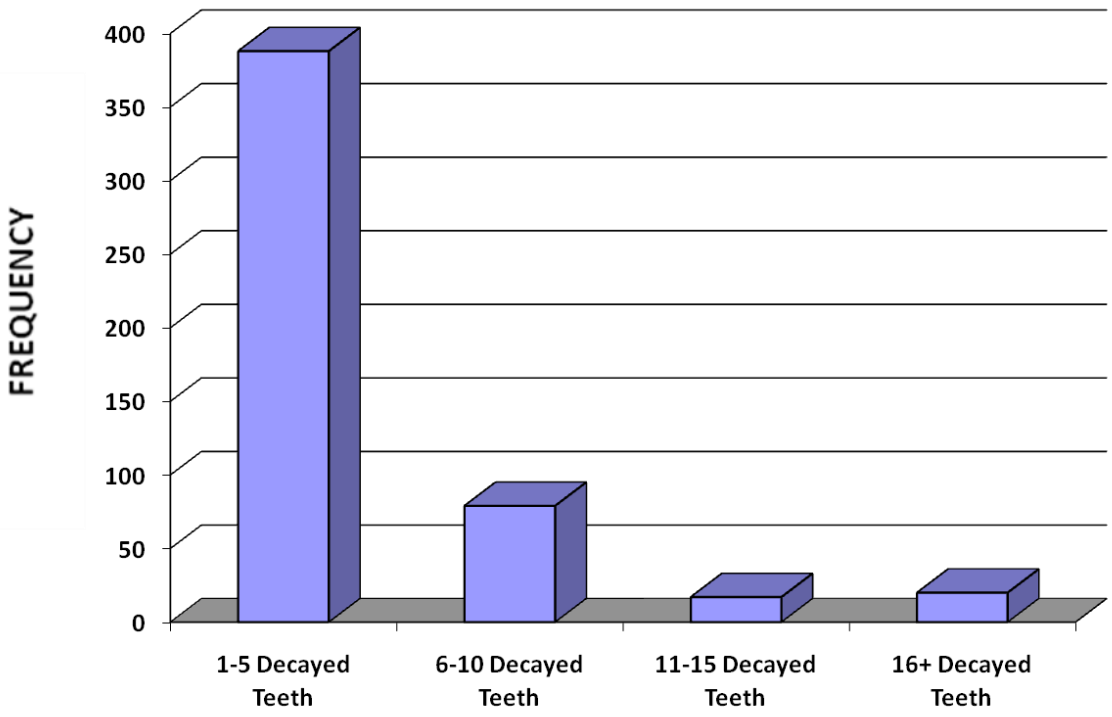
Only 16% (158) of patients attending the salaried dental service in SE CHP between January and March 2008 had no obvious decay experience. In terms of each age group, 79% (50) of all patients aged 0-4 years and 26% (96) of all patients aged 5-15 years had no obvious decay experience. Only 2% of both the 20-64 year old age group (n= 10) and the 65+ age group (n=2) had no obvious decay experience.

Of those with obvious decay experience 59% (491) had decayed teeth (ranging from 1 to 19 decayed teeth): 75% (620) had filled teeth (ranging from 1 to 26 filled teeth), 66% (544) had missing teeth (ranging from 1 missing tooth to being edentulous).

- Decayed Teeth

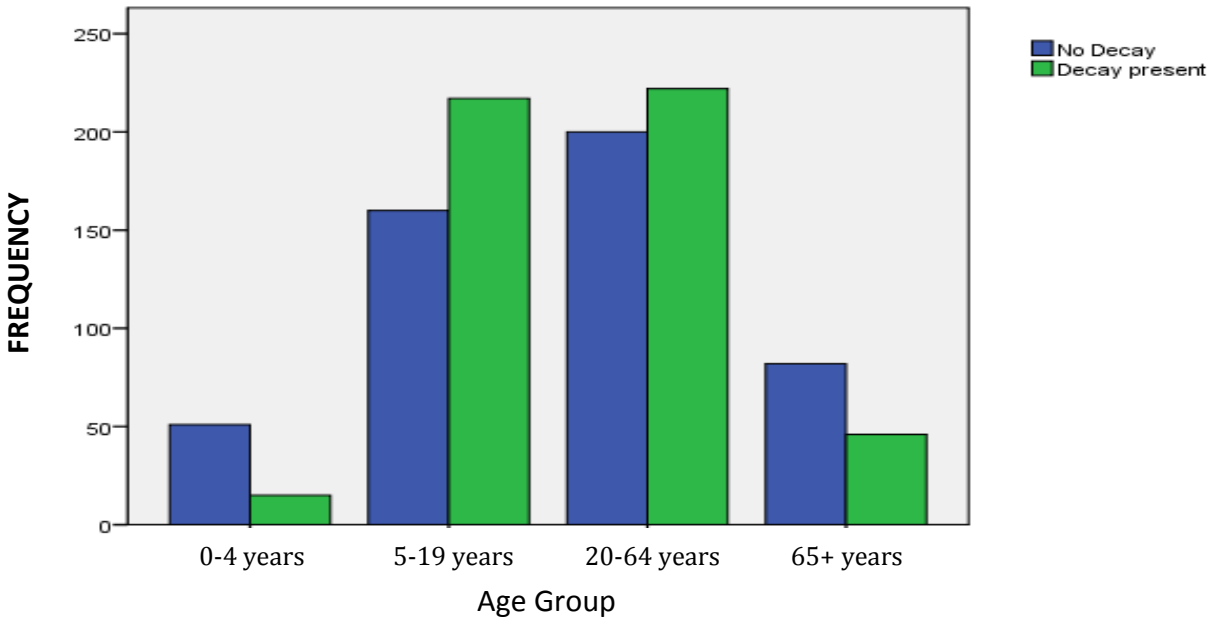
Seventy-eight percent of individuals with dental caries had between 1-5 decayed teeth category. The remainder had between 6-10 decayed teeth (16%) with smaller minorities having 11 or more teeth decayed (6%) (Figure 15).

Figure 15: Distribution of Decayed Teeth



Patients attending the salaried dentists during the study within the older or younger age groups (0-4 year olds and the 65+ year olds) tended presented with no obvious decay experience decay (77% of 0-4 year olds and 64% of the 65 years and over) while 58% of the 5-19 year old age group and 53% of those aged 20-64 years presented with one or more decayed tooth.

Figure 16: Comparison of Decayed Teeth by Age Group



The mean number of decayed teeth for 0-4 year olds was 3.92 (95%CI: 2.63, 5.22): for 5-15 year olds was 3.17 (95%CI: 2.74, 3.59): for 16-19 year olds was 2.90 (95%CI: 1.78, 4.02): for 20-64 year olds was 1.88 (95%CI: 1.57, 2.19) and for those aged 65 year and above 0.98 (95%CI: 0.62, 1.34). Patients in the oldest age group compared with others had significantly smaller mean numbers of decayed teeth ($F[4,977]=7.25$:$P<0.001$).

- Missing Teeth[3]

Five hundred and forty-six patients had missing teeth. Forty-four percent (239) had between 1-5 missing teeth category. Twenty-three percent of the patient population had 16 or more missing teeth; 21% (114) had between 6-10 missing teeth and the remaining 12% (68) had between t 11-15 missing teeth.

Figure 17: Distribution of Missing Teeth

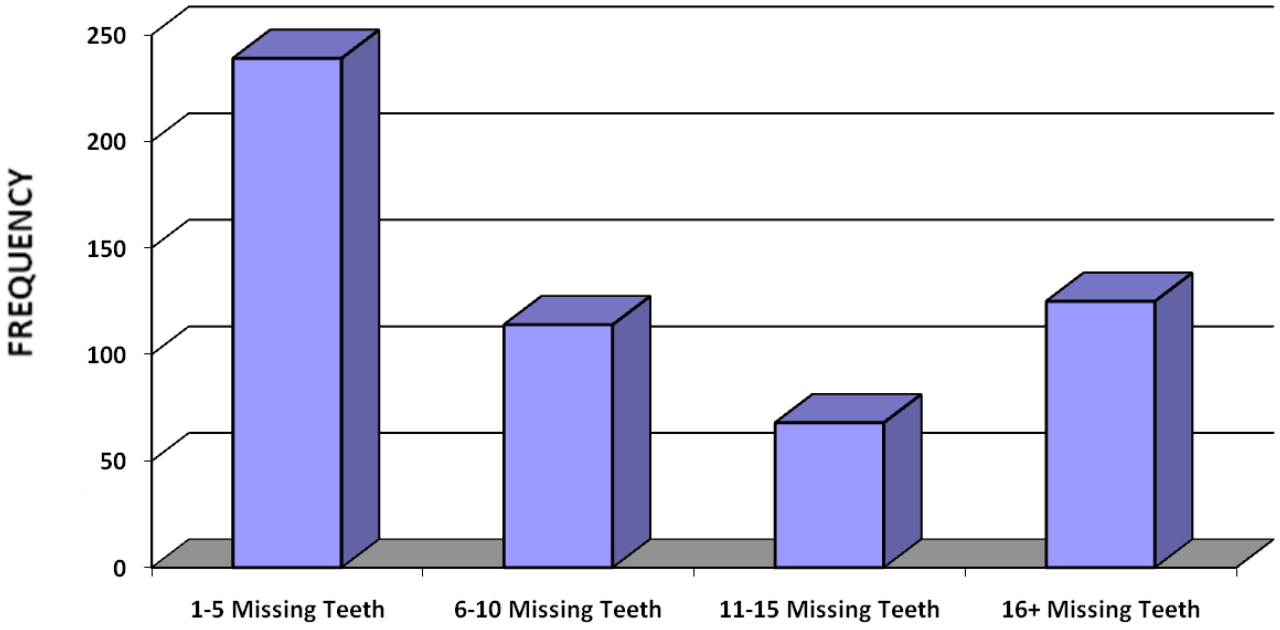


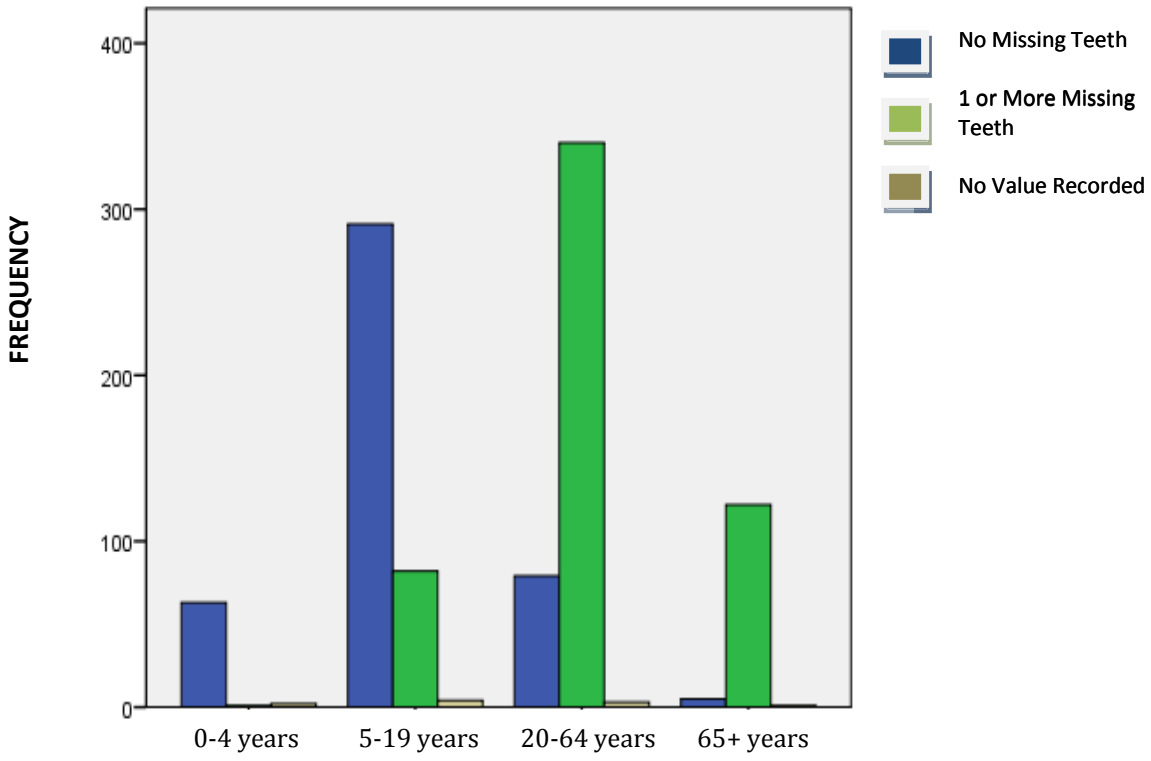
Figure 18 shows the number of patients with missing teeth by age group. More patients from younger age groups were fully dentate (95% of 0-4 year olds and 77% of 5-19 year olds) whereas those from the older age groups (81% of 20-64 year olds and 95% of 65+ year olds) had missing or extracted teeth.

The mean number of missing teeth for 0-4 year olds was 0.15 (95%CI: 0.10, 0.49): for 5-15 year olds was 1.12 (95%CI: 0.80, 1.43): for 16-19 year olds was 2.22 (95%CI: 0.85, 3.59): for 20-64 year olds was 6.86 (95%CI: 6.14, 7.58) and for those aged 65 year and above 17.46

[3] Of the 1000 patients 10 had no value recorded for missing teeth

(95%CI: 15.83, 19.10). Patients in the older age groups compared with others had significantly greater mean numbers of missing teeth (F[4,978]=183.71:P<0.001).

Figure 18: Comparison of Missing Teeth by Age Group



- Filled Teeth[4]

Six hundred and twenty three patients had filled teeth (Figure 19). Forty percent (253) had between 1-5 teeth filled: 28% (173) had between 6 to 10 teeth filled: 22% (136) had 11-15 teeth filled and 10% (61) had 16 or more teeth filled.

When the number of individuals with no filled teeth was compared to those with one or more filled teeth it was found that there was a difference according to patient age group. More patients within the younger age groups (95% of 0-4 year olds and 60% of 5-19 year olds) had no filled teeth while those within the older age groups (90% of 20-64 year olds and 75% of 65+ year olds) had filled teeth (Figure 20).

[4] Of the 1000 patients 9 had no value recorded for filled teeth.

Figure 19: Distribution of Number of Filled Teeth

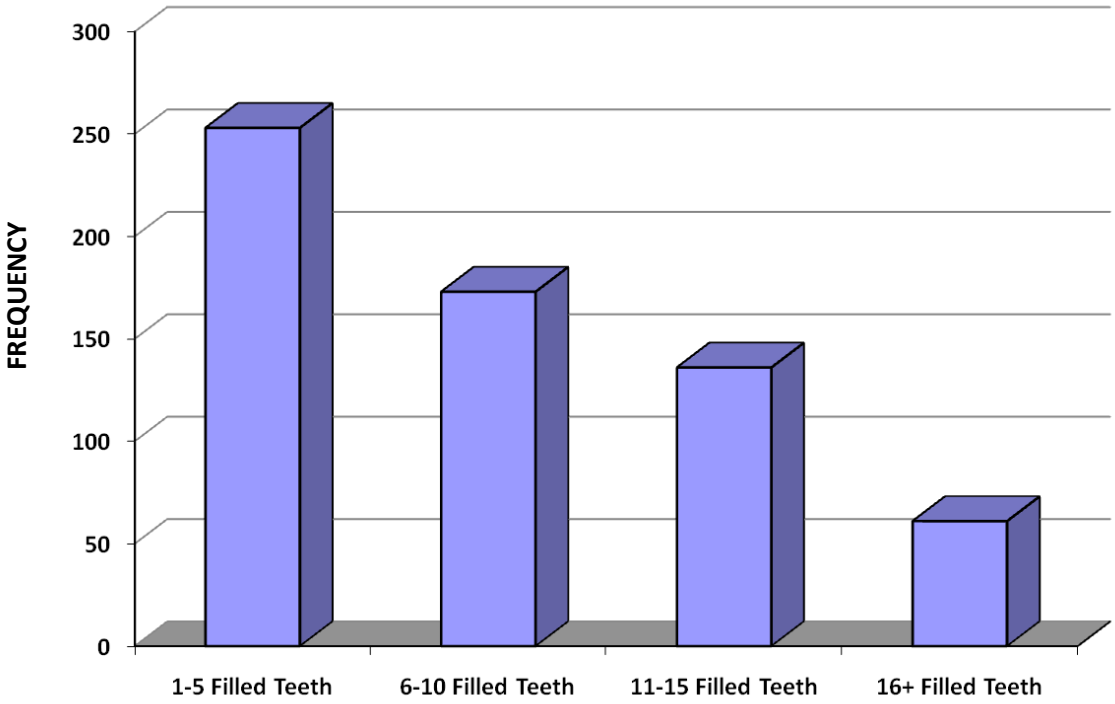
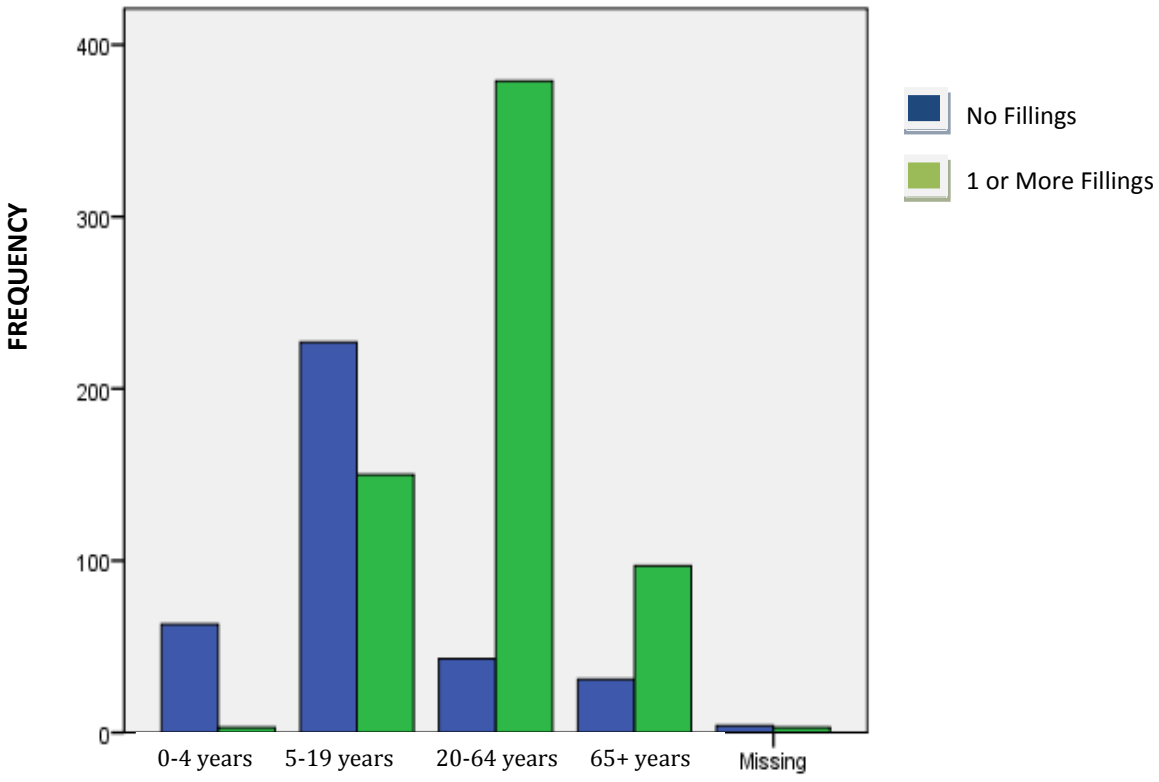


Figure 20: Comparison of Filled Teeth by Age Group



The mean number of missing teeth for 0-4 year olds was 0.08 (95%CI: 0.00, 0.24): for 5-15 year olds was 1.23 (95%CI: 0.98, 1.48): for 16-19 year olds was 3.78 (95%CI: 2.70, 4.86): for 20-64 year olds was 9.16 (95%CI: 8.60, 9.72) and for those aged 65 year and above 6.09 (95%CI: 5.11, 7.07). Age explained the significant differences in filled teeth in this population of patients (F[4,979]=160.03:P<0.001).

- **DMFT**

The mean DMFT for 0-4 year olds was 0. 86 (95%CI: 0.37, 0.1.35): for 5-15 year olds was 3.96 (95%CI: 3.53, 4.39): for 16-19 year olds was 7.81 (95%CI: 5.96, 9.65): for 20-64 year olds was 17.46 (95%CI: 16.70, 18.22) and for those aged 65 year and above 24.28 (95%CI: 23.18, 25.37). Age explained the significant differences in DMFT in this population of patients (F[4,975]=381.80:P<0.001).

4.3.4 Oral Mucosa

Nine hundred and fifty four (96%) had no oral mucosal lesions. Of the 40 patients with lesions, 35 patients had lesions which required monitoring: 5 patients had lesions that required immediate referral. Fifty percent oral lesions were located on the buccal mucosa and of those requiring referral the buccal mucosa (2 patients), tongue (2 patients) and floor of mouth (1 patient) were the areas of concern.

4.4 Total WCMT Score: Patient Complexity, Clinical Status and Clinic Attended

Of the 1000 patients included in this study, 64% were identified as having at least 1 complexity of difficulty in accepting dental treatment. The sample was divided into two groups according to their total WCMT score: patients with no difficulties (360) were designated as standard patients and awarded a value of 0 and those with one or more difficulties (640) were designated as complex patients and awarded a value of 1.

The patient age groups were divided into two age groups using a median split. Patients who fell into the age groups less and equal to 19 years were designated as younger patients (443) and awarded a value of 0. Patients who fell into the older age groups 20 years and over (557) were designated as older patients an awarded a value of 1. also condensed to form a younger (0-15 years) and older age group (20 years and over).

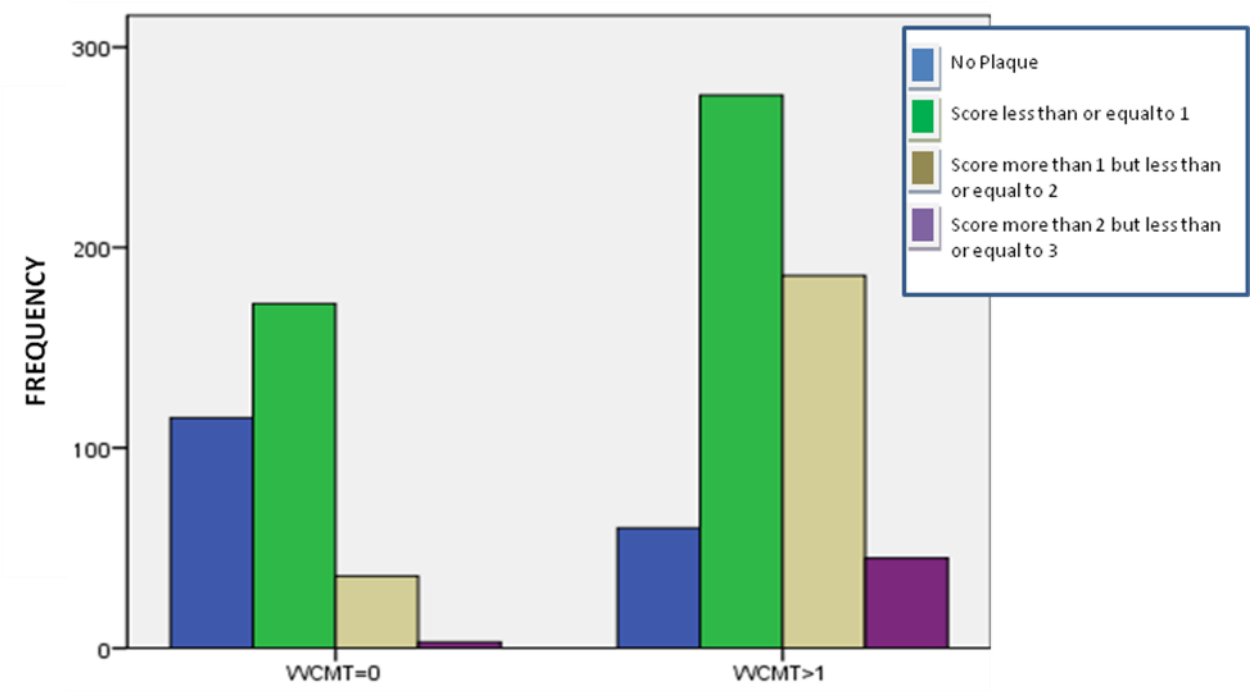
4.4.1 Total WCMT Score: Patient Complexity and Periodontal Health

- Plaque Scores[5]

Figure 21 shows the distribution of plaque scores across the two WCMT patient groups. Sixty-six percent (115) of standard patients had no plaque deposits, compared with 34% (60) of complex patients. Of the 718 patients with plaque deposits 29% (211) were standard patients compared with 71% (507) of complex patients. Thirty three percent of complex patients compared with 11% of standard patients scored more than 1 but less than or equal to 2 on the plaque index. The highest plaque score of more than 2 but less than or equal to 3 was recorded in 8% of complex compared with 1% of standard patient cases.

[5] 107 values were missing and have not been include in this analysis.

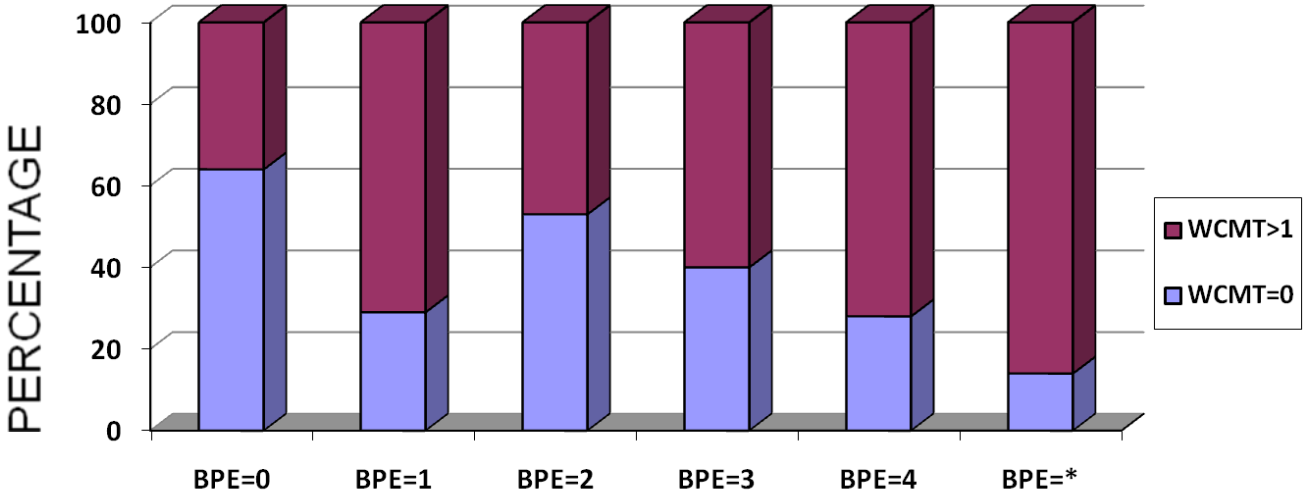
Figure 21: Patient Complexity and Plaque Scores



- Periodontal Examination (BPE)

Figure 22 shows the relationship between patient complexity and periodontal health status. Sixty-four percent (32) of standard patients had a BPE of 0 whereas only 36% (18) complex patients has a score of 0. Complex patients had greater BPE scores compared with standard patients suggested that complex patients experienced poorer periodontal disease status.

Figure 22: Patient Complexity compared with BPE Score

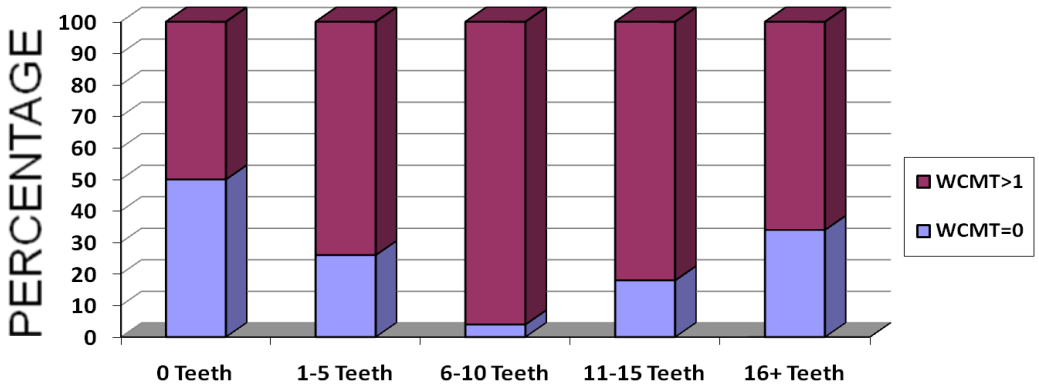


4.4.2 Total WCMT Score: Patient Complexity and Obvious Decay Experience

- Decayed Teeth

Significantly larger proportions of patients attending salaried dental clinics with at least one complexity had greater numbers of decayed teeth compared with those with no complexity ($X^2[4]=102.54:P<0.001$) (Figure 23).

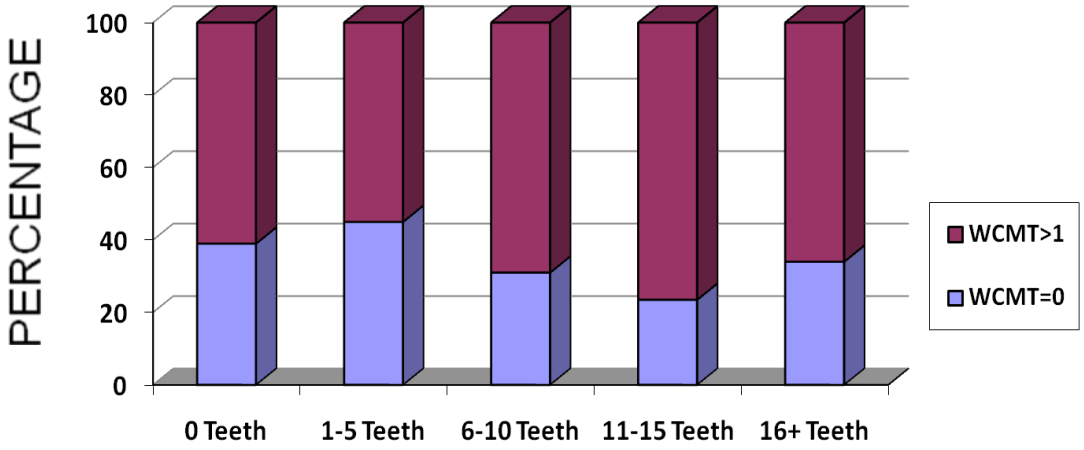
Figure 23: Patient Complexity and Decayed Teeth



- **Missing Teeth**

Significantly larger proportions of complex patients compared with standard patients had greater numbers of missing teeth ($X^2[4]=26.53:P<0.001$) (Figure 24)

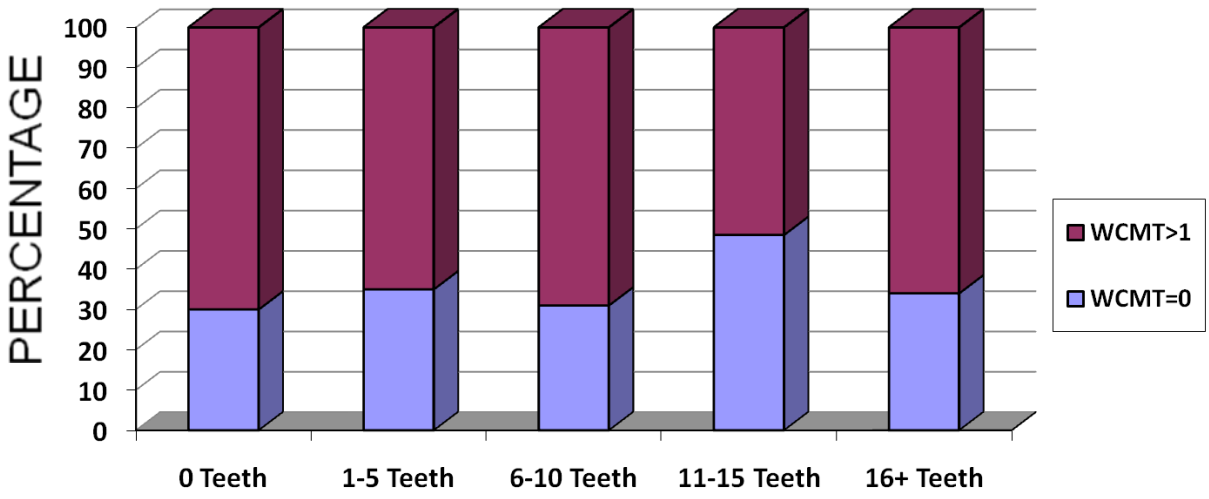
Figure 24: Patient Complexity and Missing Teeth



- Filled Teeth

Significantly larger proportions of complex patients compared with standard patients had greater numbers of filled teeth ($X^2[4]=37.20:P<0.001$) (Figure 25)

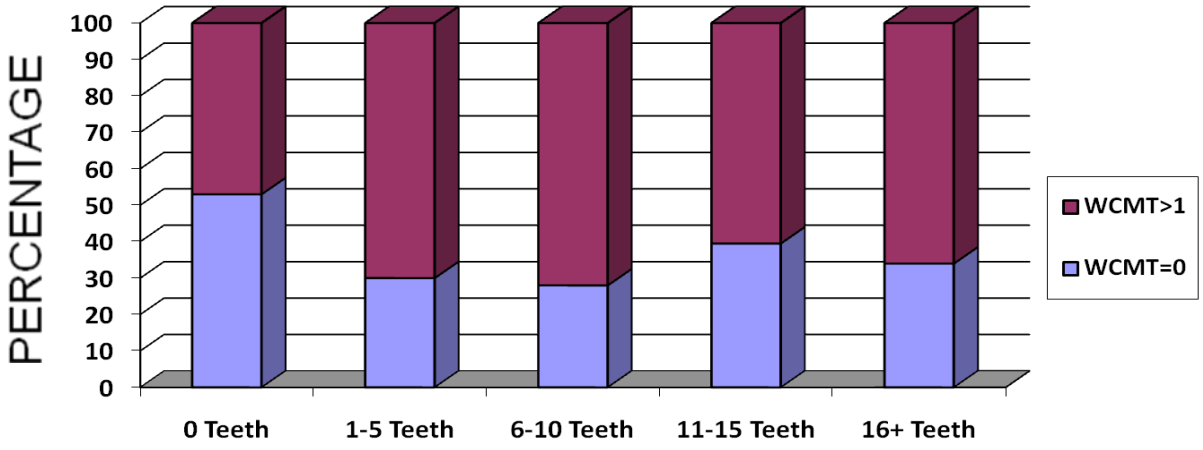
Figure 25: Patient Complexity and Filled Teeth



- Obvious Decay Experience (DMFT)

Significantly larger proportions of complex patients compared with standard patients had greater experience of obvious decay experience ($X^2[4]=28.02:P<0.001$) (Figure 26)

Figure 26: Patient Complexity and DMFT



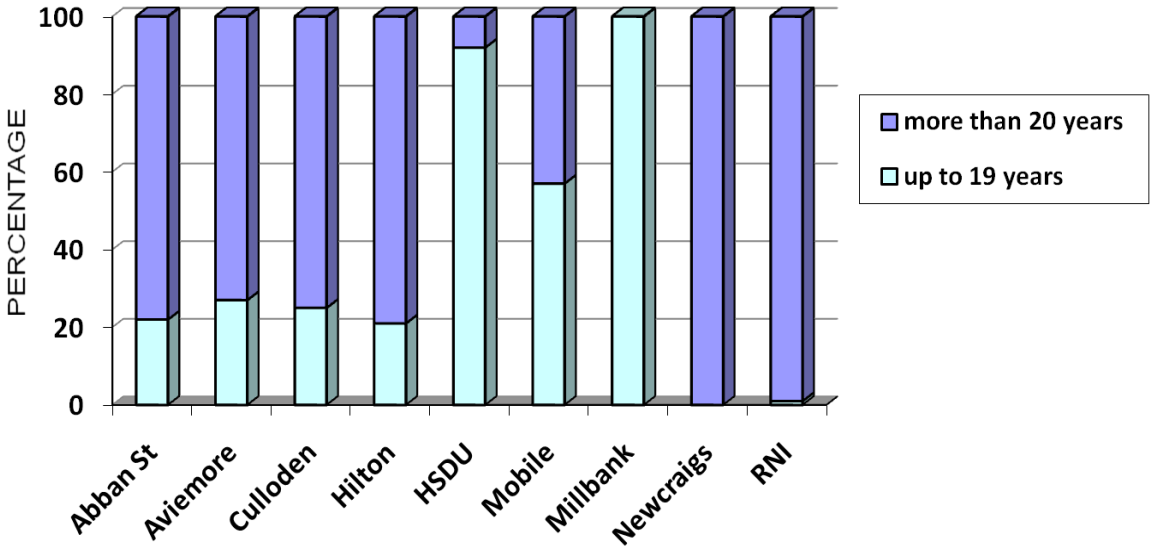
4.4.3 Total WCMT Score : Patient Complexity and Oral Mucosa

Of the 40 patients with a lesion, 75% belonged to the complex patient group.

4.5 Total WCMT Score: Patient Complexity and Clinic Profile

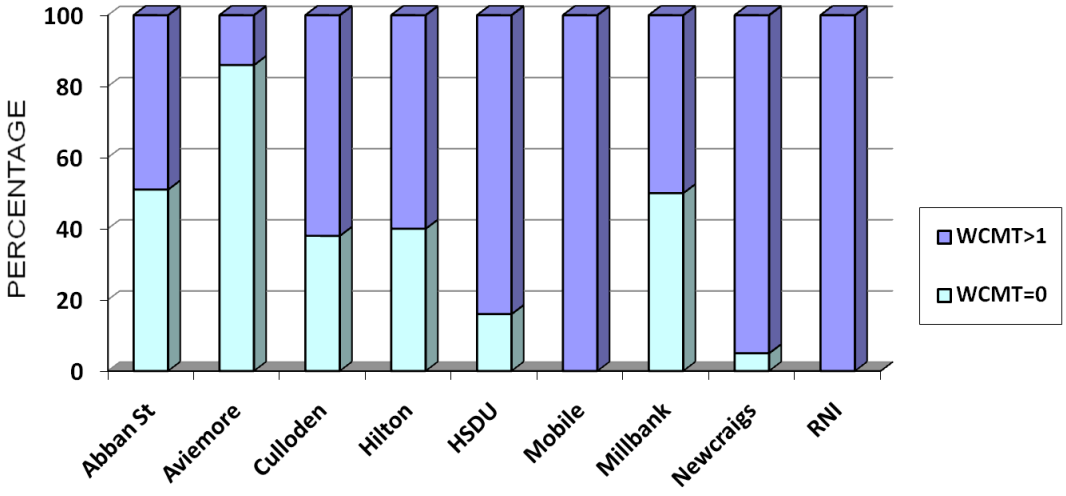
The profile of the salaried dental clinics (8 static clinics and 1 mobile dental clinic) within the SE CHP was considered. Patients were divided into younger and older groups as stated in Section 4.3. Figure 27 shows the age profile of each clinic. Over the 3 month period RNI and Newcraigs clinics saw patients aged 20 years. The Millbank Clinic, the HSDU and the Mobile Clinic treated younger patients.

Figure 27: **Clinic compared with Patient Age Profile**



All clinics in the SE CHP saw patients with complexities. The RNI and the Mobile Clinic saw only complex patients during the field trial. Ninety-five percent of Newcraigs and 84% of HSDU patients were categorised as complex. The remaining clinics had less than two-thirds of their patient caseload falling into the complex category (Figure 28).

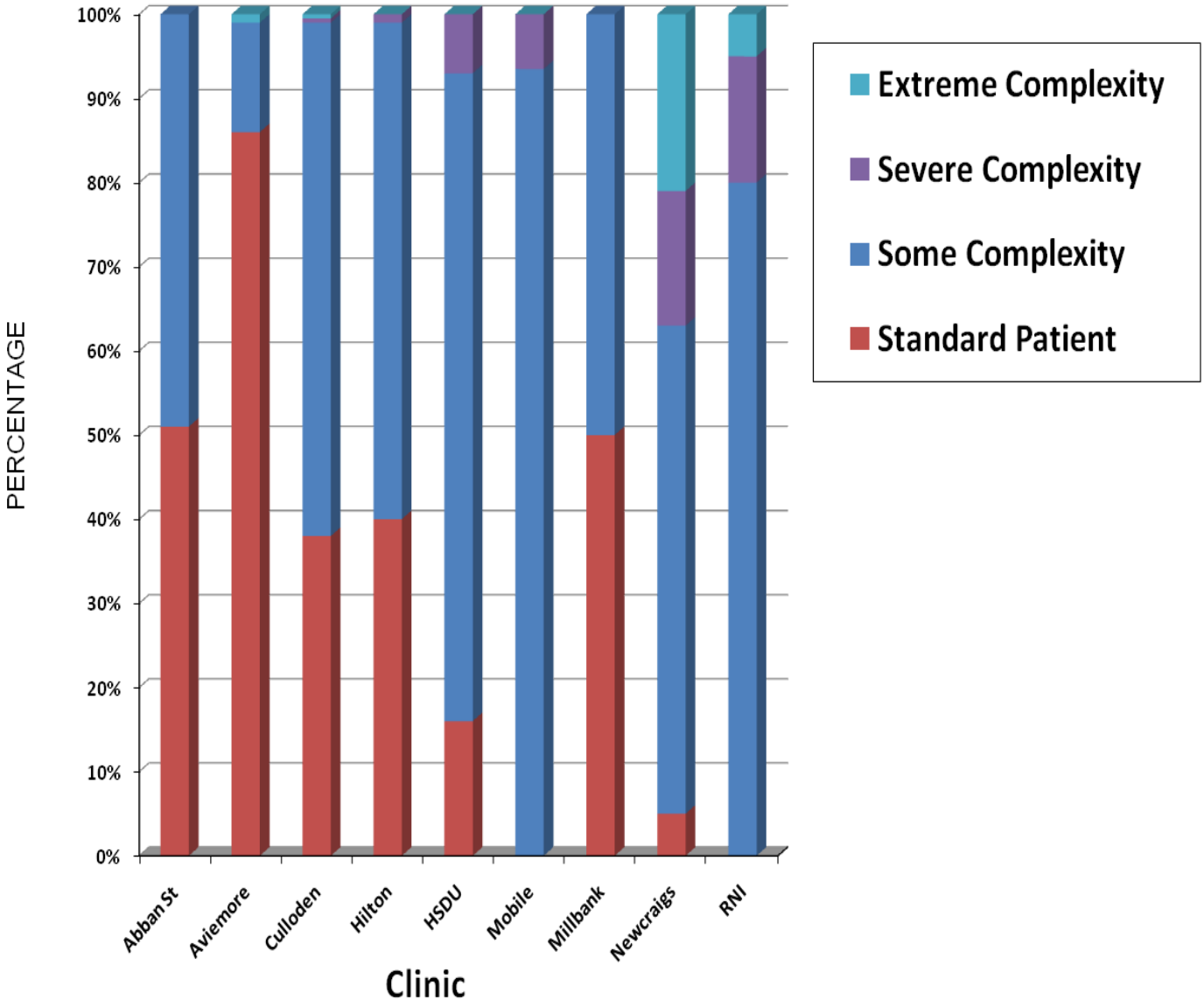
Figure 28: **Clinic compared with Dichotomised WCMT**



4.5.1 The Relationship between Clinic and Total WCMT Score

Figure 29 demonstrates patient case load by WCMT complexity for each clinic. No salaried clinic within the SE CHP saw patients characterised as having 'moderate complexity' during the 3 month period. All clinics saw patients recorded as having 'some complexity': 13% of patients in the Aviemore clinic: 61% of those attending the Culloden clinic: 59% of patients in the Hilton surgery: 77% of patients attending the HSDU,: 94% of those being serviced by the mobile unit: 60% of the patients attending Newcraigs and 80% of those at the RNI.

Figure 29: **Clinic compared with Total WCMT Complexity Score**

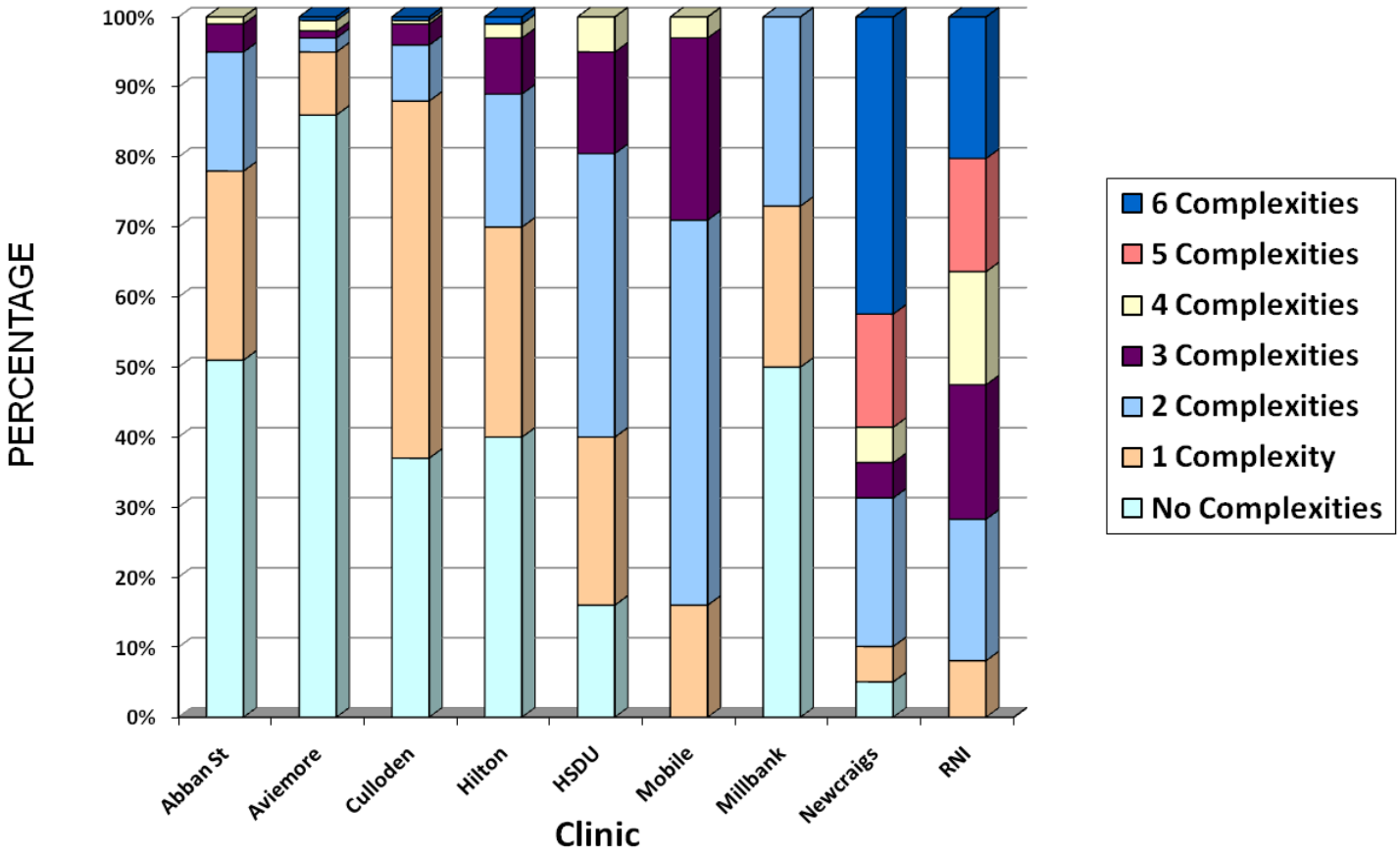


Of the patients attending the Abban Street half were recorded as having at least 1 complexity with 70 patients having 'some complexity'. Millbank clinic was similar to Abban Street Clinic with 11 patients being characterised as having 'some complexity'.

Six of the 9 clinics saw patients characterised as 'severe complexity'. These patients attended Culloden clinic (0.5%): Hilton clinic (1%): HSDU (7%): mobile dental clinic (7%): Newcraigs clinic (16%) and the RNI Clinic (15%). Patients characterised as having 'extreme complexity' attended Newcraigs clinic (21%): RNI clinic (5%): Aviemore clinic (1%) and Culloden clinic (0.5%).

Although all the salaried clinics show a spread in the number of complexities per patient, Figure 30 highlights that the RNI Clinic and Newcraigs treated greater percentages of patients with multiple complexities. The most complex individuals, those with a recording for all 6 complexity criteria, were seen within these 2 clinics (Figure 30) .

Figure 30: **Number of Complexities per Patient in relation to Clinic Attended.**



4.5.2 Characterising Patients Attending Salaried Dental Service

The sample of a 1,000 patients was divided into two groups according to their total WCMT score: patients with no difficulties (360) were designated as standard patients and awarded a value of 0 and those with one or more difficulties (640) were designated as complex patients and awarded a value of 1. Using this designation of patient management complexity a multiple logistic regression analysis was conducted. Clinic location and age were defined as dummy variables with the youngest age group and clinics designated as standard patient clinics acting as baseline. The logistic regression results are expressed as relative odds (with 95% confidence limits). These indicate the likelihood (on an odds scale) that patients with management complexities will have certain characteristics compared to those who do not have those characteristics (i.e. standard patients) Patients with management complexities were 2.43 times more likely to attend special care clinics, to be younger and to have poorer oral health status (Table 4).

Table 4 Characteristics of Patients Attending the Salaried Dental Service in SE CHP

Patient characteristics	Relative odds (exp B)	95% CL
Clinic accessed	2.48	2.00, 3.20
Patient age	-0.76	0.62, 0.94
Plaque score	1.23	1.18, 1.29
Decayed teeth	1.30	1.07, 1.44
Extracted teeth	1.10	1.07, 1.14

5.0 DISCUSSION AND CONCLUSION

The Dental Health Services Research Unit (DHSRU) was invited by NHS Highland to undertake a field trial of the BDA Weighted Case Mix Tool (WCMT) to assess the patient case-mix of those attending NHS Highland salaried dental service in the South East CHP. The survey was conducted over a 3 month period (January to March) in 2008. It involved the all salaried dentists working in the 9 salaried dental clinics within the South East region of NHS Highland. This work-stream represents the first field trial of the WCMT in Scotland. The aim of this field trial was to characterise the types of patient attending the salaried dental service in the SE CHP, NHS Highland using the BDA's Weighted Case Mix Tool (WCMT).

5.1 Demographic profile of the sample

Seventeen dentists in the 9 dental clinics took part in the field trial. Thirteen of the dentists were women. The mean number of years since qualification was 14.06 years suggesting that the dentists who provided the service had a degree of clinical experience.

The majority of patients who accessed dental care were between 20 to 64 years of age. In terms of geography people travelled from the Mid Highland CHP (such as Portree and Gairloch) as well as from within the borders of the SE Highland CHP to access the salaried dental services in SE CHP.

5.2 Weighted Case Mix Tool: Patient Complexity

The majority of patients had at least one patient management complexity. Patients ranged with regard to the degree of complexity experienced from having just one complexity ('some complexity') to many management complexities. These patients were characterised as having 'extreme complexity'. The ability to co-operate with dental care was the most common patient management complexity. As would be expected the experience of complexity increased with age with older patients having one or more complex criteria. These findings have a bearing on the character of salaried services as patients with co-operation complexities and who are older may require extended and longer appointment times [1].

5.3 Oral Health Status

A minority of the 1,000 patients were plaque free. Eighty percent had plaque while between 10% and 13% of patients had destructive bone loss. Patients with greater management complexities had greater mean plaque scores and greater experience of periodontal disease. Similarly low proportions of patients had no obvious decay experience. Patients with management complexities had greater numbers of decayed, missing and filled teeth compared with 'standard patients'. Forty patients had an oral pathology. Of these 75% belonged to the complex patient group. These findings highlighted the high treatment need within this group of patients who accessed salaried dental services in the SE CHP. It may be suggested that with this increased normative treatment need greater clinical time would be needed with each patient.

5.4 Patient Complexity and Clinic Profile

The survey demonstrates the diverse nature of the patients being seen by the salaried service in the SE CHP and the range of patients with management complexities addressed in each of the dental clinics. The management complexities ranged from those who were characterised as having some complexity to those who had extreme complexities. In some clinics such as Aviemore the proportions of patients with complexities were low compared to clinics such as Newcraigs or RNI. In fact 4 of the 9 clinics routinely treated more than 75% complex patients and 2 of these clinics routinely treated patients with multiple complexities. This suggested that the salaried dental service in SE CHP was a specialised service with regards to the treatment of patients with management complexities. It is possible to characterise the type of patient who accesses the salaried dental services in the SE CHP as those who have patient management complexities and have poorer oral health.

5.5 Conclusion

This field trial shows the case-mix and patient profile of people who access NHS Highland salaried dental services in the SE CHP. The majority of clinics treat individuals with behavioural and/or management complexities. This patient caseload represents at least 50% of clinical time. It may be suggested that the salaried dental service in the SE CHP requires greater time and resources to treat this patient group.

6.0 REFERENCES

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7.0 APPENDICES

7.1 Appendix 1 Case Mix Criteria

ABILITY TO COMMUNICATE

		PROVISIONAL WEIGHTING
0	Free communication with adequate understanding between patient, carer and dental team.	0
A	Mild restriction. • Some difficulty in communication but can overcome with or without use of aids. In most situations patient can communicate for themselves without intervention of 3rd party. • Patient speaks English but not as first language. • Patient has mild learning difficulty. • Patient has hearing impairment eg lip reads.	2
B	Moderate restriction. • Patient does not speak English and requires services of interpreter to communicate. • Limited communication possible. Problems with communication not able to be completely overcome. • Patient requires communication in writing; using sign language/Makaton or other communication aids. • Patient communication requires carer as interpreter. • Patient has moderate learning difficulty. • Patient has mild dementia.	4
C	Severe restriction. • No ability to communicate. All discussions regarding treatment conducted through a 3rd party. • Patient has profound learning disability. • Patient has advanced dementia. • Patient with advanced Huntingdon's disease. • Patient with severely debilitating brain injury.	8

ABILITY TO CO-OPERATE

		PROVISIONAL WEIGHTING
0	Not restricted. Full co-operation for treatment possible.	0
A	Some difficulty in co-operation • Able to complete examination but not all other procedures required in episode of care. • Treatment completed with a limited amount of interruption. • Patient requires up to 50% longer appointment length to complete treatment (in comparison to code 0). • Patient requires up to 2 behaviour modification/acclimatisation visits before treatment commences.	3
B	Considerable difficulty in co-operation • Limited examination only possible. • Formal risk assessment relating to any physical intervention that maybe required. • Considerable interruption disrupts provision of treatment. • Additional precautions required because of violent or inappropriate behaviour. • Patient requires more than 50% longer appointment length to complete treatment (in comparison to code 0). • Patient requires 3 or more behaviour modification/acclimatisation visits.	6
C	• Unable to exam at all without a GA • General anaesthetic or sedation required for treatment. • Patient requires 5 or more behaviour modification/acclimatisation visits prior to treatment.	12

MEDICAL STATUS

Note: This criteria covers both issues where modifications have to be made to provision of dental care due to the patients medical history, and issues where a patient's medical history is not readily obtainable at a dental appointment.

		PROVISIONAL WEIGHTING
0	Adequate medical history obtainable at appointment with no significant relevance to this course of treatment. No additional investigations required.	0
A	Some treatment modification required. • Medical history obtained but some slight modifications to patient management required e.g. antibiotic cover, prescription needed.	2
B	Moderate impact of medical or psychiatric condition on provision of care. • Complex medical condition severely affects the ability to treat and choice of treatment. • Tests and special arrangements are necessary e.g. steroid cover, INR. • Medical or psychiatric history not able to be obtained without additional investigations and enquiring with other health and social care workers. • Medical status unstable affecting provision of dental treatment eg unstable epilepsy, unstable diabetes.	6
C	Severe impact of medical condition on provision of care. • Complex medical history requiring multidisciplinary review in order to decide whether or not to treat and precautions required, eg case conferences, joint review with anaesthetists.	12

ORAL RISK FACTORS

		PROVISIONAL WEIGHTING
0	Minimal risk factors. Stable oral environment, well controlled dietary intake of sugars and acidic food/drink; good oral hygiene with minimal plaque/calculus deposits; brushes twice a day with fluoride paste; no mucosal lesions.	0
A	Moderate risk factors e.g. • Brushes at least once a day with fluoride paste/Oral hygiene fair but instruction needed; • Oral hygiene compromised by orthodontic abnormality. • Diet not well controlled. • Average 1-2 new carious lesions per year. • Course of treatment following period of neglect. • Soft tissue abnormality.	3
B	Severe risk factors e.g. • Does not brush regularly with fluoride toothpaste/Oral hygiene poor requires extensive support. • Oral hygiene relies on 3rd party to maintain. • Average three new carious lesions per year. • Altered salivation. • Access to oral cavity restricted by limited opening. • Enlarged uncontrollable tongue.	6
C	Extreme risk factors e.g. • High calorie diet. • PEG feeding. • Regular sugar-containing medication (e.g. methadone). • Severe xerostomia. • Complex treatment plan requiring multiprofessional team approach.	12

ACCESS TO ORAL CARE

		PROVISIONAL WEIGHTING
0	Unrestricted. • Patient can access surgery without staff intervention. • Child accompanied by a parent	0
A	Moderately restricted • Patient can access surgery but needs support eg needs taxi, needs carer to bring them. • Patient who arrives using a wheelchair - can transfer to dental chair themselves or with minor assistance. • Patient who has difficulty keeping appointments by virtue of their impairment or disability. • Patient whose arrangements for appointments need to be made with a carer. • Patient seen in a mobile dental surgery. • Patient who has difficulty getting into and out of the surgery and/or the dental chair, • Patient who fails to attend, or cancels at short notice, more than once in a course of treatment.	2
B	Severely restricted • Patient requires our staff to arrange transport in order to attend surgery. • Patient who needs to be treated whilst in a wheelchair eg using a wheelchair tipper. • Patient who requires the use of a hoist to transfer to the dental chair.	4
C	Domiciliary care required • Patient treated at home. • Patient treated in a hospital or nursing home bed*.	8

*This criteria is intended **ONLY** for patients seen on a “domiciliary” basis in a hospital or nursing home. Do not use for operating theatre cases.

LEGAL AND ETHICAL BARRIERS TO CARE (Excluding Scotland)

Note: This criteria includes issues related to collection of patient charges as well as the actual provision of treatment

		PROVISIONAL WEIGHTING
0	No legal or ethical issues affecting care; e.g. No problems with consent or parental responsibility.	0
A	Some legal/ethical difficulties may arise • Looked after children. • Parental responsibility requires further clarification. • Financial responsibility requires further clarification. • Clinician required to make a best interests decision not requiring a second opinion	2
B	Moderate legal/ethical difficulties may arise • Children in foster care. • Fluctuating capacity to consent due to psychiatric illness. • Consultation with other professionals/carers/relatives required in order to determine patients' best interests/capacity to consent. • Clinician required to make a best interest decision requiring obtaining a 2nd opinion.	4
C	Multi-professional consultation required in order to overcome legal/ethical difficulties • Best interest meeting/case conference required.	8

LEGAL AND ETHICAL BARRIERS TO CARE (Scotland only)

Note: This criteria includes issues related to collection of patient charges as well as the actual provision of treatment

		PROVISIONAL WEIGHTING
0	No legal or ethical issues affecting care; e.g. No problems with consent or parental responsibility.	0
A	Some legal/ethical difficulties may arise • Looked after children. • Parental responsibility requires further clarification. • Financial responsibility requires further clarification. • Clinician required to make a best interests decision not requiring a second opinion • Clinician required to assess capacity and provide treatment. Informal consultation with family and carers; No AWI certificate issued	2
B	Moderate legal/ethical difficulties may arise • Children in foster care. • Fluctuating capacity to consent due to psychiatric illness. • Clinician required to assess capacity and AWI certificate issued. Consultation with welfare attorney/ carer	4
C	Multi-professional consultation required in order to overcome legal/ethical difficulties • Best interest meeting/case conference required. • Referral to other colleagues SLT or clinical psychologists/ case conference/ 2nd dental opinion required before AWI issued or where there is a dispute	8

7.2 Appendix 2 BDA CASE MIX MODEL Training Pack

BDA CASE MIX MODEL

Training Pack

This pack contains the following sections:

1. The Case Mix Model – a users guide
    - Introduction.
    - Criteria and scoring
    - Recording and Analysis
    - Case Mix Data Form
    - Frequently asked questions
    - References
    - Acknowledgements
    - Appendix – working group terms of reference
2. The case mix model
3. Case mix scenarios
4. Guidance for commissioners

THE CASE MIX MODEL- A USERS GUIDE

Introduction

Guidance on commissioning for special care dentistry recommends that commissioners appraise themselves of the complex needs of many patients accessing special care dentistry as such contracts must reflect the additional time and resources required to provide care for this group of patients (BSDH 2006). The Department of Health in its publication 'Valuing Peoples Oral Health recommends that commissioners need information regarding the degree of difficulty in carrying out dental treatment, based on the individual's impairment or disability and the impact this has on providing a responsive service.

This case mix model is a tool designed to measure patient complexity by using a system of identifiable criteria applied to a weighted scoring system. The model identifies the various

challenges patient complexity can present dental services (such as difficulties in communication or co-operation). These may result in the need for a greater length of time or additional staff to provide care for a particular patient, in comparison to an average member of the population, irrespective of which contract currency is in use to monitor the dental work undertaken.

This model provides a methodology of describing those complex needs, which can then be used to inform contracts. In time it is expected that its use will become widespread across the country and across different models of dental service provision including secondary care and independent contractors. This will enable commissioners to benchmark the services provided to their local special needs population and ensure that the services commissioned provide for a full range of these patient's needs in a way that demonstrates value for money. It is intended that it be used as one of a number of measures to ensure adequate provision of services for this client group.

The model ranks the complexities presented, and a provisional weighting system has been applied to enable comparisons to be made, for example between different clinician's caseloads, different clinics, and in time across different services.

Each individual patient episode of care is measured separately, and as such it is anticipated that an individual patient will score differently for different episodes of care reflecting the complexity related to the nature of that episode. In this respect the model is more sensitive than a 'patient label' in that it reflects the actual level of resource required and not a theoretical level that is only needed when the patient actually needs active treatment.

Usage of the model is not restricted solely to primary dental care or to the UDA system currently operating in England and Wales. **It is important to emphasize that this is a tool to measure patient complexity. It is <u>not</u> intended to reflect or be used to give weight to the complexity of the *dentistry* undertaken.**

A trial involving 25 salaried primary dental care services in England and Wales was carried out over 2006/2007. With nearly all Strategic Health Authorities represented, data from 8500 patient episodes of care was submitted and analysed. Questionnaires were sent to participating services of which 68 were completed and returned with positive feedback on the model overall. The results helped inform the development of the following criteria and scoring methods.

Criteria and scoring

This model identifies six independent criteria that, either solely or in combination, indicate a measurable level of patient complexity. Each criteria covers both actual provision of clinical care for the patient, and the many additional pieces of work needed to facilitate care for many of these patients.

i. **Ability to communicate**
ii. **Ability to co-operate**
iii. **Medical status**
iv. **Oral risk factors**
v. **Access to oral care**
vi. **Legal and ethical barriers to care**

Each of the criteria is independently measured on a 4 point scale where 0 represents an average fit and well child or adult attending for dental care, and A, B and C represent increasing levels of complexity. The complexity may be related to the actual provision of care and/or the many additional actions necessary to facilitate care for such patients.
The criteria and the scores given relate to a course of treatment (episode of care), and will normally be assessed when a course is either completed or discontinued. There will be an element of subjectivity in assessing the scores, but this pack aims to provide you with enough information to serve as a 'best guide' model.

Specific notes regarding each criteria:

i) Ability to communicate

This criterion is intended to reflect issues of communication between the dental team and the patient while in the surgery. (Note: communication regarding appointment etc is covered under Access). Such communication may be direct between staff and patient, or may require the need for a third party to act as interpreter, advocate etc.

ii) Ability to co-operate

This criterion is intended to reflect circumstances wherein patient co-operation affects the delivery of dental care. It may be expected that clinicians with differing patient management skills may score an individual differently in respect of this criteria, or patients may vary between appointments. The grade given should reflect the average experience over a course of treatment. The definitions regarding length of appointment and behaviour

modification are intended as guides only. The highest grade C is reserved for cases involving general anaesthetic as this reflects also the greater numbers of staff necessary to provide care in these instances

iii) Medical Status

This criterion is intended to reflect circumstances wherein the patient's medical history influences the course of treatment. It also covers those circumstances where a patient's medical history is not readily obtainable, and the dental team need to undertake further enquiries or investigations before treatment can proceed. Grade C is reserved for those cases requiring time and resources of non-dental members of the health care team.

iv) Oral risk factors

This criterion aims to complement and not replace the UDA tool now in use in England and Wales. As such, the technical complexity of the dentistry provided is not relevant in assessing oral risk factors. It is acknowledged that some patients may have specific risk factors which require a higher than average resource be allocated to their care. Examples include working with carers or patients themselves in mitigating risk factors, the amount of treatment necessary to maintain oral health, or specific oral issues making provision of dental care more complex.

v) Access to oral care

This criterion aims to reflect complexities surrounding patient access to care at any point during the course of treatment. The criterion takes into account any obstacles created by the patients themselves that would hinder their access to dental care, e.g. persistent failure to attend. Grade 'C' is reserved for provision of care in a domiciliary setting or equivalent.

vi) Legal and ethical barriers to care

This criterion reflects other barriers to care not otherwise covered in the previous 5. Two of the most common are the time spent in consultation with 3rd parties to obtain consent to treat, and the difficulty identifying the financial status of some patients and thus eligibility for free treatment. This criteria should also be used when resource is necessary for other reasons to consult with guardians, advocates, or seek the opinion of a court of law for example. The highest grade C is reserved for case conferences or equivalent where a multi-professional team needs to be consulted before care can proceed.

Note that separate legal and ethical criteria are produced for Scotland to reflect differences in the legislation there with regard to adults unable to consent for themselves.

Recording and Analysis

i) Recording

A record should be made per course of treatment, and reflect the complexity presented by the patient specific to that course of treatment. It is important that all 6 criteria are judged and recorded for each episode of care.

As a rule it is recommended that the record is made at the end of a course of treatment, and reflects all activity required to complete that course. Where it is necessary to make a recording part way through a course (for example, if more than one operator is involved) it is important that the records are reviewed and, if necessary, amended at the end of the course.

Data capture methodology is available on both dental software systems commonly in use in primary dental care in the UK. Use of such systems enables grades given to be reviewed regularly, allows recording to be made mandatory prior to completion and enables alternate methods of analysis to be undertaken with the original data. Where such electronic data capture is not available it is necessary to determine the analysis required prior to design of a data capture form. An example form used in the main field trial is included in this pack, and should be adapted to facilitate the analysis required in each local situation.

ii) Provisional Weightings

In order to facilitate analysis the criteria have been assigned weightings based upon the opinion of a group of experienced clinicians in the BDA working group. In the field trial both quantitative and qualitative analysis of the main data demonstrated some validity to these provisional weightings. It can however be anticipated that with the introduction of electronic data capture and analysis, widespread use and benchmarking between services, future evidence may demonstrate a need for some adjustment. This is an area requiring further research.

	0	A	B	C
Ability to communicate	0	2	4	8
Ability to co-operate	0	3	6	12
Medical status	0	2	6	12
Oral risk factors	0	3	6	12
Access to oral care	0	2	4	8
Legal and ethical barriers	0	2	4	8

iii) Analysis

There are two recommended methods of analysis:

a) Based on the banded total score
b) Based on the maximum score

Both these methodologies have been built into the two dental software systems. It is anticipated that with more widespread usage further recognised methodologies for the most commonly used analyses will develop.

a) Banded total score

The weighting scores across all six criteria are summed to give a total score for each course of treatment. These are then allocated to one of the bands below, and the case mix can subsequently be analysed by calculating the numbers and percentage in each band, split into different cells as appropriate e.g. whole service; different age groups; different clinics; different operators.

Total Score

0	Standard patient
1-9	Some complexity
10-19	Moderate complexity
20-29	Severe complexity
30+	Extreme complexity

In the field trial this methodology clearly demonstrated a full range of variations in case mix between different operators and clinics within the same service. Thus, it would be equally appropriate to use this to benchmark one service against another though it is worth noting this would be sensitive to operators using all 6 criteria appropriately.

b) Maximum score

Of the six criteria used in the scoring, only the most complex criteria would be used in this analysis. For example, a patient requiring GA would be analysed as a 'C' category patient, irrespective of the scores for the other five criteria. While such analysis is simpler than the banded score method, the field trial demonstrated that the maximum score method was markedly less effective in highlighting the differences in case mix between operators. Such methodology is however being used in some locations to develop referral criteria, or demonstrate compliance with patient acceptance or discharge criteria.

Case Mix Data Capture Form

Patient identifier	This can be a unique patient identifier for your service, or if no identifier exists, a simple numerical count 1, 2, 3, 4 etc.
Age group	Please tick the appropriate column.
Case Mix score	Using the narrative as a guide, please insert a score (0, A, B or C) against each of the six criteria
Comments	Please add any brief comments that you may wish to feedback to us regarding the scores given (For more complex cases, see following page).

Case Mix Data Capture Form

Patient code	Age				Case mix result (OABC)						Comments
	Age 0-4	Age 5-15	Age 16-64	Age 65+	Communication	Co-operation	Medical	Oral risk	Access	Legal & Ethical	

Frequently asked questions

Every episode of patient care may not easily fit within this scoring system and common sense will be necessary in some cases. It should be remembered that the system is intended to inform clinicians, managers and commissioners of the complexity of the patients cared for within a service. It does not describe the experience of the practitioners carrying out the care and although an information pack is available for use the system does not rely on standardisation of clinicians.

Bearing this in mind, the following are the most commonly asked questions from clinicians using the system.

Q. What about patients referred for management of severe trauma and dental anomalies? Shouldn't they receive high scores?

A. Not necessarily. This system is intended to identify issues relating to the impairment and/or disability of the patient and not to the complexity of their individual dental problems.

Q. How would I reflect the time taken for full mouth rehabilitation which is very time consuming?

A. This should be recorded using different criteria. This system is intended to identify issues relating to the impairment and/or disability of the patient and not to the complexity of their individual dental problems.

Q. What about patients who need extended courses of treatment because of neglect? They are very time consuming and may not score very highly?

A. They will only score highly if they have specific impairment or disability affecting their care or they may score highly in the 'oral risk factor' section, A high score is not justified on the basis of high treatment need. This system is intended to identify issues relating to the impairment and/or disability of the patient and not to the complexity of their individual dental problems.

Q. How would I score a very quick examination in a patient with profound learning disability or dementia which is difficult but may not take long?

A. Such a patient is likely to score highly because of their lack of co-operation, and possibly would score highly in the categories of Communication (need to communicate with carers) and Law and Ethics (issues around capacity to consent).

Q. How should we record DNA appointments – especially for long appointments. Similarly what about DNAs where carers are unable to bring patients, or patients are not at home for domiciliary visits, all very time consuming.

A. It is not intended that this system be used to monitor missed appointments. Separate systems should be devised for this purpose.

Q. Some patients are easy to examine but not so easy to treat! How would we record this?

A. Since we are recording episodes of care any lack of co-operation for treatment would be recorded. Such a patient may also score in other categories eg need to communicate through carers or difficulties obtaining consent/medical history. If no treatment is required it may be that a low score would be appropriate since the impairment /disability has not affected that particular episode of care.

Q. What about inpatients with who need to be treated in a hospital environment where there is no surgery?

Anyone treated outside a 'surgery' environment should be seen as a 'domiciliary' visit and scored accordingly. Any medical condition should be scored using the appropriate 'medical status' score.

Q. How would you score a child who can communicate but the parents cannot?

A. Generally the communication of the child would be scored as normal. However if the communication /understanding of the parent is impaired this may well affect the 'legal/ethical' score relating to consent or provision of medical/social history.

Q. Some of our patients need to visit more frequently and need more input e.g. therapist and hygienist support.

A. These patients would presumably receive more than the average number of episodes of care which would be scored as any other episode. The system does not measure the length of episodes. Separate systems should monitor this.

Q. Many of our patients are only treated after years of seeing the same clinician or because of the experience of that clinician. A new dentist may see a patient differently. How can we score this?

A. The score most affected in this scenario, is that of co-operation and perhaps communication in some cases. The score should be related to the clinician treating the patient. It may be that more experienced clinicians would have different individual profiles

from those with less experience. This might be expected within individual services but also depends on the complexity of the patients, i.e. more experienced clinicians may care for more complex cases.

Q. We have no reception staff at our clinic. How can we record the increased time needed in such a situation?

A. This does not relate to the impairment and disability of the patient and would not be recorded using this system.

Q. I have a patient who wears a fixed orthodontic appliance and finds it difficult to keep it clean because of his disability. How should I record this?

A. The score which should describe the problem here relates to the oral hygiene and thus the oral risk factors but not to the appliance itself since there is no indication that the patient's disability affects the appliance therapy.

Q. I need to talk to someone else before I can proceed with treatment. How should I code this?

A. Each code relates to one episode of care so once the episode is complete a decision can be made about how much consultation was required. If it was about the impact of the medical/disabling condition and multidisciplinary review was required the appropriate Code C would be used under medical status. If however consultation is about consent or a looked after child the appropriate code would be found under legal and ethical barriers.

Q. How would I score a GA referral?

A. The code used relates to one episode of care. Once a patient is referred for a GA this becomes a new episode of care. The examination would be scored normally and the appropriate code (C) under Ability to Co-operate would be used

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Appendix

BDA WORKING GROUP TERMS OF REFERENCE

- To develop and instrument for use in measuring the complexity of providing dental care for patients of the Salaried Primary Dental Care Services. (SPDCS).
- To field test the instrument in a range of SPDCS in (?) England and Wales.
- To calibrate the instrument such that it recognises the range of complex patient management issues experienced by SPDCS practitioners.
- To make the instrument available to SPDCS for local use in commissioning, contracting, and performance monitoring situations.

In developing the instrument it is expected that it will be used alongside ‘Units of Dental Activity’ or any similar tool in use within the NHS to assess the actual dental care provided. The instrument is intended to supplement any such tool by enabling SPDCS dental teams to factor in an allowance for patient management issues necessary to provide dental care for any particular individual or client group. These may include issues of co-operation, communication or access which have a significant impact on the resource necessary to complete treatment and/or medical or oral risk factors that increase the complexity or providing care.

7.3 Appendix 3 BDA Case-mix Scenarios

SCENARIOS

Note that the narrative is written as a series of examples, which may or may not all be applicable for any specific patient. It will be the case that a particular patient scores differently for different courses of treatment – *this is deliberate as the model is intended to measure the complexity of a specific episode of care* and not be a permanent label attached to the patient.

Scenario 1

Peter W is a 32 year old who has severe learning disabilities. He lives in a unit with 24 hour nursing/ support care. Peter does not communicate verbally spending all his time colouring in pictures. Any communication is by vague gestures. It is impossible to examine his teeth except, visually, the anteriors where it is noticed he has copious amounts of calculus on lower incisors. Medically he has epilepsy with seizures weekly, the majority of which are self limiting but occasionally require use of buccal midazolam to control. It is agreed to examine Peter with use of IV sedation in order to examine his posterior teeth and undertake scale and polish. On examination it is noted Peter is caries free with only scaling required.

• Ability to communicate	C	(No ability)
• Ability to cooperate	C	(Sedation required)
• Medical status	B	(Epilepsy unstable)
• Oral risk factor	B	(OH 3rd party needed)
• Access	A	(Relies on carer)
• Legal & Ethical	B	(Best interests with consultation)

Scenario 2

Mrs B is 86 and lives in a nursing home. She was diagnosed with dementia 8 years ago. Medically she is fit and well, but has been prescribed aspirin, statin and antipsychotic medication. She has had difficulty eating recently and the nursing home has asked for a visit. Mrs B is difficult to examine as she does not open her mouth for very long. Communication is extremely difficult. With encouragement from nursing staff it is possible to determine that she is dentate with no caries but has acute gingivitis and poor oral hygiene. She also has a very mobile lower molar that was extracted on a subsequent visit with some difficulty. Arrangements have been made for the hygienist to visit and work with carers to improve oral hygiene.

- Ability to communicate C (communication via 3rd party)
- Ability to cooperate B (considerable difficulty)
- Medical status A (some treatment modification)
- Oral risk factor B (OH poor)
- Access C (domiciliary)
- Legal and Ethical B (best interests with consultation)

Scenario 3

Rebecca is an 8 year old who fell in the playground and fractured her upper central incisor suffering pulpal damage. Although attending her GDP she was referred to the salaried service 3 weeks later for management of a non- vital open apex tooth. Rebecca attends with her mother, and is a cooperative child and once treatment of the incisor was completed she returned to her GDP.

- Ability to communicate 0
- Ability to cooperate 0
- Medical status 0
- Oral risk factor 0 (trauma not a risk factor)
- Access 0 (adult with child code 0)
- Legal & Ethical 0 (parental consent code 0)

Scenario 4

Miss A is a 40 year old lady who has cerebral palsy and is profoundly deaf. She lives in supported housing and has use of a British sign language interpreter. She is able to consent to treatment herself and makes a cross on the consent form to indicate this. She undergoes a course of treatment including fillings and extractions with sedation.

• Ability to communicate	B	(sign language)
• Ability to cooperate	C	(sedation)
• Medical status	0	
• Oral risk factor	A	(course following neglect)
• Access	A	(access with support)
• Legal & Ethical	0	

Scenario 5

John is a 44 year old male patient with advanced Huntingdon's disease, and has considerable involuntary movement. He has limited understanding and is unable to communicate directly. His mother assists with communication and also tries hard to brush his teeth with limited success. He frequently has 3 or 4 new carious lesions annually, and in this course of treatment it has been possible to restore 3 buccal cavities over 4 visits using moderate restraint in the dental chair.

• Ability to communicate	C	(communication via 3rd party)
• Ability to cooperate	B	(moderate restraint)
• Medical status	0	(no impact on dental care provided)
• Oral risk factor	B	(OH relies on 3rd party)
• Access	A	(access with support)
• Legal & Ethical	A	(best interests with no 2nd opinion)

Scenario 6

Anne is 32, is HIV positive and is on combination therapy. She has had a recent haematological investigation and you write to her consultant for the results. She is anxious about dental treatment, and has three carious teeth, one of which can be restored and three require extraction. At the first visit she consents to this plan, but DNAs the next two visits, and you discontinue treatment.

- Ability to communicate 0
- Ability to cooperate 0
- Medical status B (complex/ additional enquiries)
- Oral risk factor A (course following neglect)
- Access A (DNA)
- Legal & Ethical 0

Scenario 7

James is 36 and has learning disabilities. His communication is limited and you obtain a partial medical history from the carer. The carer does not have the details of James' medication and you write to the GP for this. In fact he is just on medication for asthma and epilepsy. The carer is asked to investigate further responsibility for patient charges. With much persuasion and behaviour management you manage a simple visual examination of James' mouth. The only findings are poor oral hygiene and generalised periodontitis, which will be managed with scaling and root planing. You refer him to the hygienist.

- Ability to communicate B (limited communication)
- Ability to cooperate B (limited examination)
- Medical status B (additional enquiry)
- Oral risk factor B (poor OH)
- Access A (access with support)
- Legal & Ethical A (self consent with further clarification)

Scenario 8

Trevor is 65 and lives in a care home. He is communicative and cooperative and has an uncomplicated medical history. His carer brings him to your mobile surgery and on examination you find moderately good oral hygiene with little evidence that he is periodontally susceptible. One filling requires replacement in addition to a minor scaling. Previously Trevor has been assessed as lacking capacity to consent, and an advocate has been appointed. The advocate does not live locally and consultation is required before treatment can commence. This is done over the telephone before the next appointment, and treatment is completed without incident.

- Ability to communicate 0 (Lacks capacity but communication OK)
- Ability to cooperate 0
- Medical status 0
- Oral risk factor 0
- Access A (mobile clinic)
- Legal & Ethical B (consultation with advocate)

Scenario 9

Tom has profound learning disabilities and attends the surgery in a wheelchair. He arrives at the surgery in a taxi arranged by his mother. You use the hoist to transfer him to the dental chair for examination. His medical history, obtained from his mother indicates cerebral palsy, and medication for epilepsy. His mother does not report any behaviour indicating a dental problem. Examination is very difficult, and you only manage to see the anterior teeth. A small and possibly carious buccal lesion is seen on an incisor and but many surfaces are obscured by calculus. You arrange a case conference with your colleagues and agree that as it is many years since he had a full examination you will arrange a GA for full exam, and to treat the cavity identified plus anything else found.

- Ability to communicate C (no communication)
- Ability to cooperate C (GA used)
- Medical status A (medication / patient management)
- Oral risk factor B (restricted access)
- Access B (hoist)
- Legal & Ethical C (case conference)

Scenario 10

Natalie, aged 7 attends with her mother who provides medical details. (nil relevant) Natalie is anxious and requires considerable persuasion for examination. She is caries free but oral hygiene needs improvement with support from the parents. You arrange for a couple of visits with the hygienist to acclimatise her to the dental surgery

- Ability to communicate 0
- Ability to cooperate A (exam with difficulty)
- Medical status 0
- Oral risk factor A (OH fair support needed)
- Access 0 (adult with child code 0)
- Legal & Ethical 0

Scenario 11

Ernest is 76 and is cared for by his partner with social services input. He has early signs of dementia, and recently had a stroke. He also has had severe arthritis for many years resulting in poor mobility. The referral letter from his GP indicates current medication of a total of 14 different drugs. He is referred because he has lost his dentures and is having difficulty eating. You see him on a domiciliary basis and initially there is some resistance to examination. Ernest indicates he does not want new teeth. After conferring with his partner regarding your concerns about his being able to cope with new dentures, you decide not to proceed and write back to his GP reporting this.

- Ability to communicate A (some difficulty)
- Ability to cooperate A (Completed exam with some difficulty)
- Medical status B (complex multipharmacy)
- Oral risk factor 0
- Access C (domiciliary)
- Legal & Ethical 0

Scenario 12

Mavis is 70 and lives in a care home following a stroke. Her blood pressure is controlled by medication and she is on statins and a low cholesterol diet to prevent recurrence. The clinic arranges transport for the patient to attend the surgery, where you find she is cooperative for examination. Clinically she requires one extraction of a very mobile tooth and replacement dentures. During the examination you find some inconsistency in the things she is telling you, and following discussion with the carers you agree that there is some uncertainty regarding her capacity to consent. You arrange for a mental capacity assessment to be done, which indicates she is competent for all but the most complex decisions.

- Ability to communicate 0 (communication OK)
- Ability to cooperate 0
- Medical status A (slight modification)
- Oral risk factor 0
- Access B (clinic arranges transport)
- Legal & Ethical C (multi-professional consultation)

Scenario 13

Maud is 82 and wheel chair bound. She is brought into the surgery by her active husband. Maud is dominant and will not allow you to speak to her husband. He manages to communicate with the nurse that she has been to see a dentist several times without receiving any treatment. She says that she is younger than him and to speak to her. She manages to transfer to the dental chair with difficulty. There appears to be little of relevance in the medical history other than arthritis and hypertension for which she is taking appropriate medication.

Examination reveals a few standing upper anterior teeth with a pointing sinus above the UL2, 2 lower standing teeth of which one is grade 3 mobile and a very ill fitting lower denture which she is unable to wear. Her oral hygiene is poor and she will not allow anyone to assist her with it.

Following examination the patient is informed of the findings and offered treatment alternatives. The patient seems confused about the options and they are repeated to her on several occasions. A treatment plan is eventually agreed. However at the next visit the patient is not happy to have treatment without the explanation and the whole appointment is spent going through her options.

The dentist then decides to confirm the medical history with her GP. The GP writes that she has been diagnosed with Obsessive-Compulsive Disorder but that she refuses to acknowledge the problem or receive any treatment for it. It also appears that she has memory problems. You agree with the patient that you will write to her with all the findings and her options for treatment, which she will return to you with a tick list of which option she wants. Over several prolonged visits with reference each time to her tick list you are able to finally extract the UL2 and the grade 3 mobile tooth and provide her with new partial dentures. She ignores your preventive advice.

• Ability to communicate	B	(in writing)
• Ability to cooperate	B	(considerable interruption)
• Medical status	B	(additional enquiries)
• Oral risk factor	B	(poor OH)
• Access	A	(access with support)
• Legal & Ethical	A	(self consent after further clarification)

7.4 Appendix 4 Clinical slideshow for Basic Inspection Standardisation

DMFT Recap

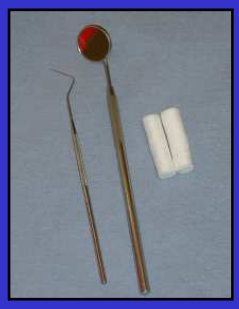
Highland Study Day

Rhona Brown and Jenny Hally

Dental instruments

Recommended dental instruments are:

- Plane mouth mirror
- Blunt ball-ended probe (CPI) with an end diameter of 0.5 mm.
- Cotton wool rolls or cotton buds for drying teeth
- Fresh set of previously sterilised instruments for each subject.



Drying Teeth

- BASCD recommend cotton wool rolls, gauze or cotton wool buds.
- For caries and fissure sealant diagnosis drying is recommended wherever diagnosis is in doubt and surfaces are obscured with saliva.

Use of the Probe

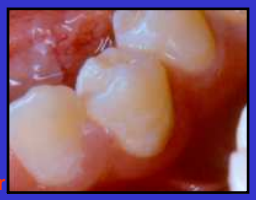
- NOT a diagnostic aid.
- Probe is used for:

i. Removing plaque and debris
ii. Checking for fissure sealants and tooth coloured fillings

Plaque Removal

- This slide shows the – buccal surfaces of teeth covered with plaque
- Visibility is obscured
- Therefore, plaque should be gently removed with the blunt ball-ended probe.

Therefore do the DMFT after the Periodontal and Plaque assessments on the form



To note:

- In DMFT where a deciduous tooth and its permanent successor are both present chart only the permanent tooth
  - e.g. in the situation where both a primary and permanent lower incisor are present.

The next series of slides presents examples of teeth which would be coded as sound

They would not be included in the DMFT count

7

White spot lesion

8

Stained Fissure

- Stained fissure/enamel caries
- Stained pits or fissures in the enamel not associated with a carious lesion into dentine are coded as sound.

9

Hypoplasia

- 24 – lingual surface has enamel loss and an orange/brown lesion.
- This is hypoplasia, a developmental defect of the enamel.
- Surface is scored sound.

10

Sealed Surface, Type Unknown

- 24 & 25 –occlusal surfaces have been sealed
- Score as Sound

11

Obscured surfaces

- Tooth 26 – the orthodontic band obscures the mesial, distal, lingual and buccal surfaces
- Surfaces are coded sound

Obscured surfaces are assumed to be sound in the same way as unseen surfaces of a partially erupted tooth.

12

The next series of slides illustrate surfaces with Decay = would be included in No. of Carious teeth score in the DMFT

13

Arrested Dentinal Decay

14

Decayed

- Distal fissure has
  - Break in enamel
  - Widened fissure
  - Grey shadow beneath the enamel

15

Decayed

16

Decayed

- 22 mesial surface – dark shadow beneath the enamel
- Shadowing continues beyond the ADJ and into the dentine

17

Decayed

- Carious lesions involving dentine on lingual surfaces of upper lateral incisors
- Upper left central incisor (21) has heavily stained pit
- No apparent break in enamel of 21, no opacities beneath enamel which are present in lesions on laterals

18

Decayed

Decay with Pulpal Involvement

- Upper anterior deciduous teeth decayed into dentine
- Mesial surfaces of central incisors likely to be decayed with pulpal involvement

Filled and Decayed

- 36 occlusal surface has been restored with amalgam which is fractured
- There are 4 separate areas of secondary caries, i.e. caries associated with the filling.
- Two of the carious areas are in the distal and disto-buccal parts of the fissure and are characterised by cavitation into dentine.

N.B. If a tooth is decayed and filled it should be included in the **carious teeth count**

The next series of slides illustrate cases which would be included in No. of Missing Teeth Score in the DMFT

Missing extracted due to caries

- Only missing teeth due to caries should be included here
- Any missing (due to caries) deciduous canines and deciduous molars should be included in count.
- Missing deciduous incisors are not included.

The next series of slides illustrate surfaces with fillings = would be included in No. of Restored Teeth Score in DMFT

Filled with No Decay

- 36 – amalgam filling on the mesial and occlusal surfaces
- Filling is intact and there is no evidence of secondary caries.
- Occlusal fissure system has areas of staining only.

25

Filled with No Decay

26

Filled with No Decay

- 26 –occlusal surface has a conventional tooth coloured filling.
- No evidence of decay and filling appears intact.

27

Filled with No Decay

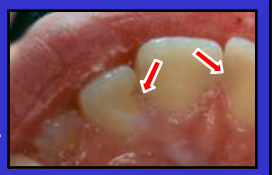
- 12, 11, 21 & 22 – several intact tooth coloured fillings are present
- e.g. mesial of 22, distal of the 21, distal of the 11.

(NB a careful systematic examination is needed to avoid missing tooth coloured fillings if possible)

28

Filled, Needs Replacing (not carious)

- 12 – mesial surface has had a filling which is completely lost
- This is the most extreme form of a "defective" filling.
- Additional features on this slide:
- 21 – has a composite restoration on mesial surface - careful examination is needed to avoid missing these restorations.



29

Filled, Needs Replacing (not carious)

30

Filled, Needs Replacing ("not carious")

- Occlusal surface is filled with amalgam.
- Amalgam is chipped and fractured to expose the cement lining.

Obvious Sealant Restoration

Crown / Advanced Restorative procedures

- 75 and 85 – preformed metal crowns

Surface code C – Crown / Advanced Restorative procedures

- 13 – lingual surface of forms the retainer for the pontic, replacing the 12