An audit of the Restorative Dentistry Index of Treatment Need Complexity Assessment

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Abstract

Objectives: To audit the complexity of dental care provided by the Salaried Primary Care Dental Service using the Restorative Dentistry Index of Treatment Need Complexity Assessment (RDITN), as a measure of the complexity of treatment carried out and to present the index as a potential candidate for inclusion in a ‘basket of indicators’ for contracting Special Care Dentistry in the UK.

Design: The audit was carried out in three dental clinics in Hampshire over the period of 2005-2006; data were collected over two representative periods for 327 treatment episodes. Following clinical examination, each patient had the complexity of his or her treatment plan recorded according to the Complexity Assessment of the RDITN.

Results: Nearly three quarters of treatments involved fixed or removable prosthodontics (>70%); 27% of treatments were for periodontal problems. Very few root canal treatments were carried out. The majority (over 70%) of treatments fell into Complexity Code 2. Fixed and removable prosthodontics was nearly all Code 2. Periodontal treatment involved a more even mix between Code 2 and Code 3. The distribution of Complexity Assessment scores was very similar in both years.

Conclusion: The Restorative Dentistry Index of Treatment Need Complexity Assessment was used to provide a quick and easy assessment of the complexity of treatment for patients needing special care. The results showed very little change over a two-year period.

Key words: Restorative Dentistry Index, special care indicators

Introduction

In the UK, the British Society for Disability and Oral Health has recently produced a policy document for supporting commissioning of Special Care Dentistry (British Society for Disability and Oral Health 2006) including the proposed framework for the role of a special care dentist, based on the work of the then Joint Advisory Committee for Special Care Dentistry (Joint Advisory Committee for Special Care Dentistry 2003). The role envisaged for the specialist will be to integrate primary dental care as well as providing treatment services in secondary care, including inpatient/day case surgery. The model also sees the development of dentists with a special interest (DWSI) in Special Care Dentistry. These dentists would provide care for patients with mild or moderate needs and disability, who would have the majority of their care provided in primary dental care. To ensure the best use of resources, the workload will need to be divided in the most efficient way so that the treatment is carried out in the centre that has the appropriate facilities. It will also be essential to improve the skills of the operators (Adam Smith, 1776). In this way, Special Care Dentistry will be provided by a dental professional, a dentist or a dental specialist, and patients will be seen in both primary and secondary care.

Supporting the contracting process to provide dental care to this population will depend on a clear indication of which groups are to be treated. There will also need to be clear indicators to ensure all the health care needs
The unit of dental activity (UDA) is used as a measure of the dental activity when contracting primary dental care for the National Health Service. The UDA is a very basic measure of activity and to rely solely on this index would be a very poor way to measure the provision of Special Care Dentistry. The Department of Health has indicated that ‘UDAs should not be used to manage dental care delivered by salaried primary care dental services. UDAs are a useful way of monitoring and comparing service levels provided they are part of a basket of indicators that comprise oral health, access, quality and patient experience.’ (British Dental Association, 2007a)

The Central Committee for Community and Public Health Dentistry (CCCPHD) of the British Dental Association Case Mix Working Party have developed an index for use in measuring the complexity of providing dental care for special care patients in the salaried primary dental care services (SPCDS) in the UK (British Dental Association, 2007b). The aim is to use the index alongside UDAs, and other indices, as a way of measuring the contribution made by disabilities to the complexity of providing dental care. The index measures: ability to communicate, ability to co-operate, medical status, oral risk factors, access to oral care and legal and ethical barriers to care.

The International Classification of Functioning, Disability and Health (ICF) has also recently been proposed as a basis for defining the population in need of Special Care Dentistry (Faulks and Hennequin 2006).

Neither of these indices measures the complexity of the dental treatment carried out for the patient. The CCCPHD case mix index will prove to be a very valuable contracting tool; however, if it is used as the sole special care index for contracting care for patients there will be two weaknesses in the process. Firstly, there is no assessment of the complexity of the treatment to be carried out. This would be useful as an index for allocating patient treatment to primary or secondary care and in managing the interface between Special Care and other dental specialities, such as Restorative Dentistry. Secondly, the index is most powerful when it measures the score at the completion of treatment. When planning services and allocating resources an index which measures the score before treatment starts will be an excellent companion to the CCCPHD case mix index.

The Royal College of Surgeons of England have published the Complexity Assessment as part of their Restorative Dentistry Index of Treatment Need (RDITN) Royal College of Surgeons, 2001). Of the indices available, this index would seem to represent the ideal companion to the CCCPHD case mix index for contracting Special Care Dentistry. The aim of the present audit was to use the RDITN to measure the activity in the salaried, primary care dental services (SPCDS).

**Restorative Dentistry Index of Treatment Need**

The complexity assessment is an important component of the RDITN. Following a clinical examination it can be used to assess the complexity of the treatment problem identified. Each component of the assessment should be considered separately and may be the only relevant component for that patient. A complexity code should be assigned, if applicable, before progressing to the next component (Figure 1). Each complexity component has a series of three core codes 1-Low, 2-Moderate, 3-High to which a modifying factor may apply. Modifying factors are similar for each component of the index although there are minor variations; they should be applied to each component of the assessment (Figure 2-5).

A modifying factor can only increase a complexity score by one code increment, they are not cumulative. Following completion of coding the overall restorative dentistry complexity code would be represented by the highest component code. Two examples of scoring from the audit have been given (Figures 6 and 7). Recent changes in clinical practice would give a different score in Case 1 if repeated today.

Patient treatments of complexity code 1 are generally suitable for treatment in general dental practice. Most code 2 patients are either suitable for treatment by general practice dentists with a special interest or specialist practitioners. Code 3 patients have more complex treatment needs and are generally better managed in secondary care.

**Material and methods**

From June to September 2005 all adult patients treated in the East Hampshire PCT SPCDS had the complexity of their treatment plan recorded according to the Complexity Assessment of the RDITN and the exercise was repeated in December 2006. The assessment codes were recorded on a pro-forma collection sheet that is provided with the RCS Complexity assessment document. If a patient was treated more than once during the period then both complexity assessments were included. Treatment complexity assessments were recorded for 270 treatments in the period June-September 2005 and for 57 treatments in December 2006.

**Results**

The majority of treatments involved fixed or removable prosthodontics, often intra-coronal restorations (Figure 8). About 20% treatments were for periodontal problems. Very few root canal treatments were carried out. Of all treatments, the majority (over 70%) fell into Code 2 (Figure 9). Periodontal treatment involved a more even mix between Code 2 and Code 3; fixed and removable prosthetics was nearly all complexity Code 2 (Figures 10-12).
**Figure 1 Assessment procedure**

- **Periodontal Assessment** Code 1 2 3 (Apply modifying Factor) Y N ↓
  - **Periodontal Complexity code** Code 1 2 3

- **R.C.T. Assessment** Code 1 2 3 (Apply modifying Factor) Y N ↓
  - **R.C.T. Complexity Code** Code 1 2 3

- **Fixed Prosthodontics Assessment** Code 1 2 3 (Apply modifying Factor) Y N ↓
  - **F. Prostho Complexity Code** Code 1 2 3

- **Removable Prosthodontics assessment** Code 1 2 3 (Apply modifying Factor) Y N ↓
  - **R. Prostho Complexity Code** Code 1 2 3 ↓
  - **Highest Code Recorded = Restorative Dentistry Complexity Code**

**Discussion**

Two of the most recognisable treatment indices in use at present are the index of Orthodontic treatment Need (IOTN) and the Community Index of Periodontal Treatment Need (CPITN) (Ainimo *et al.*, 1982). The IOTN index is established as a useful index for contracting specialist orthodontic services in the UK (Brook and Shaw, 1989). Until now there has been no equivalent, accepted index for a contractor of Special Care Dentistry services to use in the contracting process.

A successful index will be able to convert a clinical finding into a numerical index that can then be used to compare one patient with another or to group patient findings into common categories. Looking at the most frequently used indices, the successful ones have been very specific in the stage of the dental care pathway that they measure. This is essential in order to achieve an index in which the value ascribed by the index can be relied on to record a valid clinical situation. The inevitable result is that each successful index is only valid as a measure of a very closely defined part of the overall clinical pathway. One example is the CPITN, developed by the World Health Organisation to enhance planning of periodontal dental services. This has proved a very useful tool which has also been used as a measure of severity of periodontal needs of an individual and to link the index of severity to treatment protocols. The index is of less use in monitoring the progress of treatment or the success of treatment for the individual. In addition to this, the index also gives no real clue as to the complexity of carrying out treatment for a given individual.

The other well-recognised index is the IOTN index which was developed specifically to assess orthodontic cases prior to treatment. The index has gained widespread acceptance as an indicator of treatment need and has been widely used in the UK as a gateway to treatment with only the higher scoring individuals receiving treatment. This index has two components to the assessment but a recent survey found that most consultants were not using the aesthetic component as this gave conflicting results (Daniels and Richmond, 2000; Oliveira, 2003). Another shortcoming of the IOTN index is the lack of ability to measure the complexity of the treatment required.
Periodontal Treatment Assessment
Based on the Basic Periodontal Examination (BPE) Criteria

- B.P.E. Score 1-3 in any sextant = Complexity 1
- B.P.E. Score 4 in any sextant
- Surgery involving the periodontal tissues = Complexity 2
- Surgical procedures associated with osseointegrated implants
- Surgical procedures involving periodontal tissue augmentation and/or bone removal (e.g. crown lengthening)
- B.P.E. score of 4 in any sextant and including one or more of the following factors:
  - patients under the age of 35 smoking 10+ cigarettes daily
  - A concurrent medical factor that is directly affecting the periodontal tissues
  - Root morphology that adversely affects prognosis
  - Rapid periodontal breakdown > 2mm attachment loss in any one year
  = Complexity 3

Modifying factors that are relevant to periodontal treatment

A modifying factor can only increase complexity by one increment. Multiple factors are not cumulative.
- Co-ordinated medical (e.g. renal; Cardiac) and/or dental (e.g. orthodontic/oral surgery) multidisciplinary care
- Special needs for the acceptance or provision of dental treatment
- Mandibular dysfunction
- Atypical facial pain
- Undiagnosed facial pain
- Presence of a retching tendency
- Limited operating access
- Concurrent mucogingival disease (e.g. erosive Lichen Planus)
- Medical history that significantly affects the clinical management:
  - Patients requiring IM or IV medication as a component of clinical management
  - Patients with a history of head/neck radiotherapy
  - Patients who are significantly immuno-compromised or immuno-suppressed
  - Patients with a significant bleeding dyscrasia/disorder
  - Patients with a potential drug interaction.
Figure 3 Root Canal Assessment

Root Canal Treatment Assessment

- Single/ multiple root canals with curvature < 150° to root axis that are considered negotiable from radiographic or clinical evidence through their entire length. No root canal obstruction or damaged access.
- Incision and drainage
  = Complexity 1

- Single/ multiple root canals with curvature > 150° but < 40° to root axis that are considered negotiable from radiographic or clinical evidence through their entire length.
- Teeth with incomplete root development
  = Complexity 2

- Single/ multiple root canals with curvature > 40°
- Single/ multiple root canals that are not considered negotiable from radiographic or clinical evidence through their entire length
- Periradicular surgery
- Teeth with iatrogenic damage or pathological resorption
- Teeth with difficult root morphology
  = Complexity 3

Modifying factors that are relevant to root canal treatment

A modifying factor can only increase complexity by one increment. Multiple factors are not cumulative.

- Co-ordinated medical (e.g. renal; cardiac) and/or dental (e.g. orthodontic/ oral surgery) multidisciplinary care
- Special needs for the acceptance or provision of dental treatment
- Mandibular dysfunction
- Atypical facial pain
- Undiagnosed facial pain
- Presence of a retching tendency
- Limited conventional operating access
- Endodontic re-treatment
- Surgery in the proximity of important anatomical structures e.g mental foramen
- Surgery where there is periodontal pocketing > 3.5mm
- Medical history that significantly affects the clinical management:

  - Patients requiring IM or IV medication as a component of clinical management
  - Patients with a history of head/neck radiotherapy
  - Patients who are significantly immuno-compromised or immuno-suppressed
  - Patients with a significant bleeding dyscrasia/disorder
  - Patients with a potential drug interaction.
Fixed Prosthodontics Treatment Assessment

This basic assessment assumes that the proposed restorative dental treatment will conform to the existing occlusion.

**Fixed restorations include:**
- Intra coronal restorations
- Veneer restorations
- Extra coronal restorations including pontic units

- Restorations not involved in anterior guidance, where there are adequate sound or restored teeth to predictably maintain the existing occlusion
  = **Complexity 1**
- Restorations that contribute to anterior guidance where there are insufficient sound or restored teeth to predictably maintain the current guidance
- Extra coronal restoration of any one posterior sextant (all teeth), not involved in anterior guidance where a terminal unit is involved
  = **Complexity 2**
- Extra coronal restoration of the complete anterior guidance including pontic units
- Extra coronal restoration of opposing sextants (all teeth)
- Restorations that are supported by osseo-integrated implants.
  = **Complexity 3**

Modifying factors that are relevant to fixed prosthodontic treatment

A modifying factor can only increase complexity by one increment. Multiple factors are not cumulative.
- Co-ordinated medical (e.g. renal; Cardiac) and/or dental (e.g. orthodontic/oral surgery) multidisciplinary care
- Special needs for the acceptance or provision of dental treatment
- Mandibular dysfunction
- Atypical facial pain
- Undiagnosed facial pain
- Skeletal base alveolar discrepancy that adversely affects the occlusion
- Evidence of significant parafunction
- Presence of a retching tendency
- Limited operating access
- Concurrent mucogingival disease (e.g. erosive Lichen Planus)
- Reorganisation of the occlusion required
- Alteration in the occlusal vertical dimension
- Radiographic evidence of 50% reduction in bone support
- Medical history that significantly affects the clinical management:
  - Patients requiring IM or IV medication as a component of clinical management
  - Patients with a history of head/neck radiotherapy
  - Patients who are significantly immuno-compromised or immuno-suppressed
  - Patients with a significant bleeding dyscrasia/disorder
  - Patients with a potential drug interaction.
Figure 5 Removable Prosthodontics Assessment

Removable Prosthodontics Treatment Assessment
This assessment applies to the partially dentate patient, the edentate patient is excluded

- Prostheses with bounded saddles replacing posterior teeth
- All mucosa-born prostheses
- Prostheses replacing anterior teeth where there are adequate sound or restored teeth to provide anterior guidance
  = Complexity 1

- Free end saddle prostheses which are dependent upon differential support
- Prostheses with problems involving the path of insertion and/or available undercuts where some tooth modification is involved
- Prostheses which contribute to anterior guidance
  = Complexity 2

- Prostheses where abutment teeth require extra coronal restoration to improve stability and retention
- The use of sectional prostheses
- Prostheses involving osseo-integrated implant support
- Presence of oro-facial defects requiring obturation/restoration
  = Complexity 3

Modifying factors that are relevant to removable prosthodontic treatment

A modifying factor can only increase complexity by one increment. Multiple factors are not cumulative.

- Co-ordinated medical (e.g. renal; cardiac) and/or dental (e.g. orthodontic/oral surgery) multidisciplinary care
- Special needs for the acceptance or provision of dental treatment
- Mandibular dysfunction
- Atypical facial pain
- Undiagnosed facial pain
- Skeletal base alveolar discrepancy that adversely affects the occlusion
- Evidence of significant parafunction
- Presence of a retching tendency
- Limited operating access
- Concurrent mucogingival disease (e.g. erosive Lichen Planus)
- Reorganisation of the occlusion required
- Alteration in the occlusal vertical dimension
- Medical history that significantly affects the clinical management:
  - Patients requiring IM or IV medication as a component of clinical management
  - Patients with a history of head/neck radiotherapy
  - Patients who are significantly immuno-compromised or immuno-suppressed
  - Patients with a significant bleeding dyscrasia/disorder
  - Patients with a potential drug interaction.
Case 1 A 36-year-old male with a history of drug abuse, infective endocarditis, asthma, hepatitis C carrier currently on methadone, smokes 15 cigarettes a day.

Teeth Charted: 7652 123567 BPE: 2 2 2
76543 467 2 2 2

Treatment carried out under intravenous antibiotic cover:

Cons: 431

Extraction: 5 7

Scale and polish

Periodontal treatment assessment
BPE 1-3 in any sextant = Complexity 1 → Modifying factor → medical history that significantly affects clinical management → patients requiring IM or IV medication as a component of clinical management → Yes apply modifying factor → Complexity code =2.

RCT No treatment

Fixed prosthodontics treatment assessment
Restorations not involved in anterior guidance, where there are adequate sound or restored teeth to predictably maintain the existing occlusion = Complexity 1 → medical history that significantly affects clinical management → patients requiring IM or IV medication as a component of clinical management → Yes → apply modifying factor → Complexity code =2.

Removable prosthodontics treatment assessment
All mucosa-borne prostheses = Complexity 1 → Modifying factor → medical history that significantly affects clinical management → No → do not apply modifying factor Complexity code =1.

Highest code = Restorative Dentistry Complexity Code = 2

Figure 6

Figure 6a

Figure 6b

Figure 6c
Case 2 A 44-year-old male with a history of renal transplant which is failing, insulin-controlled diabetes mellitus, medication includes tacrolimus and cyclosporin. Recent blood results INR 1, Neutrophils 6.6 $10^9$/L, Creatinine 520 umol/L (normal 60-110)

<table>
<thead>
<tr>
<th>Teeth Charted:</th>
<th>BPE:</th>
</tr>
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<tbody>
<tr>
<td>876654321</td>
<td>123568</td>
</tr>
<tr>
<td>8754321</td>
<td>1234578</td>
</tr>
</tbody>
</table>

BPE: 4 4 3

Treatment:
Hygiene phase periodontal therapy.

Restoration: 6

**Periodontal treatment assessment**
BPE 4 in any sextant and including one of the following factors – a concurrent medical factor that is directly affecting the periodontal tissues = Complexity 3 → Modifying factor → Co-ordinated renal/dental multidisciplinary care → Yes apply modifying factor → Complexity code = 3.

**RCT No treatment**

**Fixed prosthodontics treatment assessment**
Restorations not involved in anterior guidance, where there are adequate sound or restored teeth to predictably maintain the existing occlusion = Complexity 1 → Modifying factor → Co-ordinated renal/dental multidisciplinary care → Yes apply modifying factor → Complexity code = 2.

**Removable prosthodontics treatment assessment**
no treatment

Highest code = Restorative Dentistry Complexity Code = 3

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**Figure 7**

$Figure 7a$ $Figure 7b$ $Figure 7c$
Figure 8

Percentage of treatment plans involving specific sub-speciality components of the Complexity Assessment

- Perio
- RCT
- F Pros
- R Pros

Year 1
Year 2

Figure 9

Percentage of treatment plans in each complexity code

- Code 1
- Code 2
- Code 3

Year 1
Year 2
**Figure 10**

Percentage of treatment plans involving periodontal treatment in each code category

**Figure 11**

Percentage of treatment plans involving removable prosthodontics in each code category
However, one of the great advantages of the IOTN is that it allows prioritisation of patient treatment. Hospital and consultant clinics should ideally only treat those patients with the most complex and difficult treatments (Morris and Burke, 2001a). The development of the IOTN as a way of prioritising referrals to secondary care has been a useful step in improving the quality of referrals. In the same way, the RDITN of the Royal College of Surgeons of England could be an important index for improving appropriate referrals for special care patients.

The RDITN was used in the first year of this study to gain baseline figures for the patients treated in the SPCDS. In the second year, the data were collected over one month to allow comparison with the baseline figures. One month was chosen as sufficient time to gather adequate figures without making the data collection requirements too onerous for clinical staff. This was seen as an important consideration as it is planned to repeat the data collection biannually. The data are presented as a simple percentage with no statistical interpretation. The audit has been used in this Trust to monitor the appropriate nature of the treatment carried out in the SPCDS and has shown that the level of treatment complexity has remained fairly constant from one year to the next.

The index does have a number of disadvantages when used in the SPCDS. The two most obvious are that it does not apply to the treatment of children and that it does not include the provision of full dentures. One of the clinicians who took part in the audit is a specialist in prosthodontics so the number of grade 3 patients seen in this audit may be higher than in a service that has no specialist practitioner.

The contracting authority have agreed to use this index as one of the basket of indicators for the SPCDS as part of the Trust’s service level agreement, on condition that it is applied to all eligible patients, by all clinicians and that data are collected over a one month period on two occasions each year. This helps the dental service show that the agreed level of dental care activity is being provided and allows the contracting authority to understand what they are purchasing.

The majority of treatments carried out in the SPCDS fell into code 1 for complexity but were then moved up to code 2 by a modifying factor. This is what would be expected in a service providing routine dental care to patients needing special care and contrasts with the results of a previous audit where treatment complexity in the SPCDS was compared with complexity of treatment provided on a consultant restorative clinic. Treatment complexity in the consultant clinics was most often code 2 or code 3, as would be expected. Consultants in Restorative Dentistry are willing to see special care patients with complex restorative needs but at the same time Special Care Dentistry is not seen as a priority for their service (Morgan, 2003).

To achieve the best balance in services when contracting care, the index could also be used as a tool to help allocate patients referred for treatment to the SPCDS and consultant restorative clinics. The ideal interface between primary and secondary care should present no barriers to the provision of care once the referral has been made. An efficient service will ensure patients are referred back to the primary care setting once specialised care has been completed (Morris and Burke, 2001b), or as an alterna-
tive, NHS secondary care providers could be community-based (Lewis and Gilmour, 2004).

Setting up a service with appropriate referral pathways and funding the service will require specific, valid indicators of the complexity of providing dental treatment to special care patients. Efficient shared-care systems and the coordination needed to make services complementary, will require valid indices of treatment complexity and patient assessment. The dental profession has become used to the idea of treatment indices. Valid indicators of the complexity of providing dental treatment to special care patients such as the RDITN, could be essential tools in securing funding for services providing dental care to these patients.

Conclusion

An audit has been carried out using the RDITN, first as a baseline then repeated a year later. The audit was simple to carry out with little variation from year to year. The index would appear to provide a robust tool for inclusion as one of a ‘basket of indicators’ when contracting Special Care Dental services.

References


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