A CRITICAL REVIEW ON INDICES IN CHILDREN

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Abstract

Dental indices are tools used to quantify dental diseases thereby cross comparisons can be made based on disease burden and treatment efficacy. In dental literature, there exists an ambiguity on selecting the ideal scale or index to measure dental diseases. This is because of the availability of different indices and the lack of standardization among dental associations in measuring diseases. This warrants the need for a critical assessment of available indices commonly used in dental research and clinical practice. The critical appraisal of indices used for measuring oral hygiene, dental caries, gingival disease, periodontal disease, dental fluorosis, malocclusion, enamel defects, and tooth wear is attempted in this study.

Keywords: Public health, malocclusion, fluorosis, dental caries.

INTRODUCTION

Disease prevention and health promotion are the core functions of a public health professional. Prevention of a disease primarily mandates knowledge of the etiology, risk factors, the distribution pattern, and associated factors. Indices are powerful tools for any epidemiologist, a researcher, or a clinician. They are a means to quantify a clinical observation, thereby reducing the subjectivity in reporting a finding. However, with an array of indices available and the absence of an "ideal" index, making a suitable choice is often a dilemma.[1] This study attempts to critique the commonly used indices for dental conditions (dental caries, oral hygiene status, gingival and periodontal diseases, malocclusion, fluorosis, tooth wear, and enamel defects) to facilitate a careful and appropriate choice of index suited for particular needs. The criteria for performing and scoring the indices though have not been described in this study and readers may revert back to literature for basic reading.

Critical Evaluation of Dental Caries Indices

Dental caries is a widely prevalent dental disease demineralization and destruction of hard tissues of teeth. Indices used for coronal caries and those used for root caries are the types of indices to assess dental caries. One of the earliest indices for dental caries was developed by Bodecker CF and Bodecker HWC in 1931. It was found to be sensitive but too complex for use in epidemiological surveys. It was modified later by including count of decayed surfaces, and an extra count was allotted for those surfaces that could experience multiple carious attacks. Then, Trendley H Dean recorded carious teeth visible in the mouth in a systematic manner. In 1934, Mellanby M described the carious lesions depending upon the degree of severity of caries into slight caries, moderate caries, and advanced caries.

Critique

Decayed, Missing, and Filled Teeth (DMFT) index was introduced by Henry Klein, Carrole E. Palmer, and Knutson JW in 1938. Several authors have critiqued the index for numerous reasons. According to Burt and Eklund, DMFT values did not account for the number of teeth at risk as it was just a count and not a ratio.[1] They argued that DMF scores were misleading without a mention of age. Perhaps, the most important drawback is the equal weightage given to missing, untreated decayed, or well restored teeth. Decayed, Missing, and

Filled (DMF) index is invalid when teeth have been lost for reasons other than caries. The presence of preventive restoration, if not properly identified, could overestimate the caries experience as is the case with tooth colored resin restorations placed only for cosmetic reasons. The original version of DMFT index did not account for sealed teeth as sealants did not exist in 1938. According to Fisher and Glick, the strengths of DMF index are that it is simplicity, acceptability, and its widespread use making comparisons between countries possible.[2] The gap existing while recording the index is that it does not record non cavitated lesions leading to underestimation of the disease. Abhishek Mehta in his review of caries indices mentions that "there are many promising new caries indices purposed, but still, there is a need for further studies to evaluate their validity and reliability before they can replace DMFT index."[3] The modified DMFT index was introduced by Joseph Z. Anaise in 1983. The modification of DMFT index involved a division of the "D" component into four separate categories. Although recording procedure is similar to that of DMFT, it provides additional information on the severity of caries which could be useful for treatment planning. The Significant Caries (SiC) Index was identify groups of individuals with the highest caries values among the population.[4] It is calculated by computing the mean DMFT values of one third of the population with the highest caries scores. It is suggested that both DMFT scores and SiC scores may be used in conjunction to highlight oral health inequalities among different population groups.[5] The Dentition Status and Treatment Need Index uses both letters and numbers while recording.[6] It was modified in 2013, and the treatment needs are excluded. The advantages are that it provides the status of both root and crown and also mentions about the treatment required. The disadvantage is that it consumes time. The Pulpal involvement, Ulceration, Fistula, and Abscess Index is used to assess the presence of oral conditions resulting from untreated caries. It is mainly used a complimentary tool[7] and to record the clinical consequences of untreated dental caries.[8] The Caries Severity Index was introduced by Tank Certrude and Storvick Clara in 1960. It measured the extent and depth of decayed surfaces and pulpal involvements based on clinical and radiographic examinations. The Caries Severity Index expresses the severity of the caries attack on affected teeth Moller's index was introduced by Moller IJ and Poulsen S in 1966. The advantage of this index was its flexibility which could be used in many different clinical situations. Diagnostic criteria are specified for various clinical types of caries, namely pit and fissure surfaces and smooth surfaces with radiographic evaluation of proximal surfaces, and untreated carious lesions are divided into four types making it amenable to analysis.[10] Limitation, however, is the need for radiographs. The Root Caries Index (RCI) was introduced by Ralph V. Katz in 1979 and is based on the requirement that gingival recession must occur before root surface lesions begin. The RCI is time consuming and only includes caries status of root structure.[10]

Critical Evaluation of Oral Hygiene Indices

The evolution of oral hygiene indices originated when John C. Greene and Jack Vermilion planned a study on gingival inflammation in mentally challenged patients. The absence of a simple and quantifying index led to the development of the Oral Hygiene Index in 1960.[11] Oral hygiene indices have many applications. In addition to patient education and motivation, it is widely used in clinical and epidemiological studies. As a result over the past few decades, several indices have been proposed, outmoded, and modified to suit specific needs. Oral hygiene indices can be broadly classified into indices that measure (i) stains and calculus, (ii) plaque, and (iii) calculus. Commonly used among them are described below.

Critique

The Oral Hygiene Index was proposed in 1960 and simplified in 1964. Initially developed as an index which measured [12] tooth surfaces, it was later simplified to an equally sensitive six surface index to reduce number of decisions required to be made by the examiner and also save time.[12] The index has been criticized for not scoring interproximal areas and giving more weightage to extrinsic stains, which is insignificant in terms of disease severity. In addition, it is believed that the estimation of

plaque and calculus beyond the gingival area does not have any clinical value.[13] Nevertheless, the index has been used in clinical settings for patient education due to its simple and fast recording but is not popular for epidemiology studies today. The Patient Hygiene Performance Index proposed by Podshadley and Haley in 1968 overcomes the limitations of the Oral Hygiene Index–Simplified (OHI-S) as it emphasizes on the proximal and gingival areas. However, the need for a disclosing agent and dichotomous scoring (presence or absence) restricts its use to clinical settings.[14] One of the major advances in assessing oral hygiene was the introduction of plaque index by Silness and Loe in 1964. This simplified index measures the quantity of plaque and is still widely used in epidemiological studies despite its limitations. The terms "film," "moderate," and "abundance" of plaque used in scoring criteria are very subjective making the process of recording 24 surface cumbersome.13 For the same reason, its applicability is limited to longitudinal studies and clinical trials where effects of quantity of plaque on gingivitis need to be assessed.[15] The relatively low application of this index in clinical settings and patient education are the reasons why this index had to undergo various modifications. The Quigley Hein Plaque Index (1962) recommended the use of a disclosing agent to stain the plaque. The scoring was restricted to the labial surface of anterior teeth and assessed the extent of plaque rather than its quantity. Turesky in 1970 modified the existing criteria by including the buccal and lingual surfaces of all teeth to achieve a more comprehensive evaluation of oral hygiene.[16] This index is at present recommended for clinical trials of preventive and therapeutic agents as it is more sensitive for gingival regions. However, careful calibration of examiners is suggested before using this index for clinical trials.[15] As the role of plaque deposition in the gingival and proximal areas of tooth surface began to be considered as a marker for the initiation and progression of gingival diseases, further indices were developed to achieve greater sensitivity. The Navy Plaque Index (1972) with its subsequent modification by Rustogi in 1992[17] and the Distal Mesial Plaque Index by Fischman et al. in 1987 were used in

clinical trials to assess the effectiveness of interdental cleaning devices.[17,18] These were also the index of choice for studying the efficacy of chemical plaque control agents as proximal areas were more likely to be missed by the toothbrush Unlike the abovementioned indices which were predominantly used for research purposes, the plaque control record by O'Leary in 1972 based on all or none law of the presence of plaque on four surfaces of teeth was a simple yet reliable method for patient education.[16] Indices measuring calculus were mainly subparts of other oral indices such as OHI-S and Periodontal Disease Index (PDI) by Ramfjord. Standalone calculus indices were the Calculus Surface Index developed by Ennever et al. in 1961 and later extended as the Calculus Surface Severity Index in 1968.[16,19] Both these indices measured calculus deposition on the four mandibular incisors and were applied for short-term clinical trials on calculus inhibitory agents. Although most trials on orthodontic patients have used either Silness and Loe Index or Quigley Hein and its Turesky modification, they fail to assess plaque accumulation around orthodontic brackets. Thus, exclusive indices to measure plaque around orthodontic brackets were also developed. The Bonded Bracket Plaque Index and Ortho Plaque Index are notable indices used in clinical trials.[20] To summarize, while most of the indices used to measure oral hygiene rely on the examiners' judgment, a few among them, particularly with the use of disclosing agents, have made the task easier and more sensitive. Indices which dichotomize plaque scores have been increasingly used in clinical settings for patient education

Critical Evaluation of Gingival Indices

Gingivitis is a highly prevalent condition in India and worldwide. Knowledge of gingival indices is of great importance as an accurate assessment of gingival health helps in preventing gingivitis which remains the first step to preventing periodontitis.[21] Several gingival indices have been developed over the years, and all of them rely on one or more of the following features: gingival color (redness), gingival contour, gingival bleeding, gingival stippling, and gingival crevicular

fluid.[21] These indices may involve visual examination, invasive components, or a combination of both these to assess gingival health. Ainsworth and Young first attempted to differentiate between children with and without gingivitis. They classified children with gingivitis into slight, medium, and severe gingivitis, but no attempt was made to quantify the findings. This was followed by works of King (1945) who tried to define mild, moderate, and severe gingivitis which subsequently led to the introduction of several new indices such as Papillary Marginal Attached (PMA) Index by Massler and Shour (1947) and its modification in 1967.10 In literature, the most frequently used gingival indices are PMA Index, Gingival Index, and the Modified Gingival Index. Various bleeding indices also exist that help to assess gingival health. Prominent among these are the Papillary Bleeding Index and the Sulcular Bleeding Index

Critique

The PMA Index, developed by Schour and Massler (1947) and described by Massler (1967), was a pioneering effort to design a numerical system for recording gingival health.[21] The initial assessment of number of gingival units was later followed by addition of a severity component. However, the index assessed only the labial surfaces with no consideration of the lingual or proximal surfaces.[21] The major purpose of this survey was to assess gingival inflammation in children.[22] It is used for epidemiological surveys and patient education and in clinical trials. To overcome the limitations of the PMA Index, Silness and Loe in 1964 developed the Gingival Index.[23] It was developed for the assessment of the gingival condition and to record qualitative changes in the gingiva. While all other indices looked at the whole tooth as a single entity, this index attempted to assess gingival inflammation by surfaces involved. Hence, the index involves examination of the buccal, lingual, mesial, and distal surfaces.[24] It was suggested that the index had good sensitivity and reproducibility.[25] Although bleeding on probing is an important criterion for this index, the difference between scoring criteria 0 and 1 is entirely based on visual assessment (color of gingiva) which,

according to the World Health Organization, is a very subjective measure making the scoring ambiguous.[25] The Modified Gingival Index was developed by Lobene RR, Weatherford T, NM Ross, Lamm RA, and Menaker L in 1986. It was a modification to the Loe and Silness Gingival Index. Major modifications were the elimination of sulcus probing and redefining the scoring system for mild inflammation to increase the sensitivity of lower values.[26] Furthermore, it employed a noninvasive approach. However, the major limitation of this index is its inherent inability to differentiate gingivitis in the absence of periodontitis as probing was not involved. Its applicability is restricted to clinical trials. The objectivity of bleeding on probing as a sign of inflammation of gingival tissues lets to the introduction of several indices in the 1970s. The Sulcus Bleeding Index was developed by Muhlemann HR and Son S in 1971. They believed that bleeding from the sulcus was the earliest sign and could be detected even before redness and edema.[24] Dichotomizing the color changes reduced the interobserver variability. As a limitation, this index does not include a category that scores for edema or change in color in the absence of bleeding.[25] Developed by Saxer UP and Mulemann HR in 1975, the rationale of the Papillary Bleeding Index is that marginal periodontitis and alveolar bone loss begin interproximally and the effectiveness of preventive procedures is more easily targeted to the presence or absence of interdental plaque. The results are translated into numerical scores which are easily comprehensible by the patient. This index can be useful to motivate patients regarding their gingival health [24]

Critical Evaluation of Malocclusion Indices

According to the branch of orthodontics, any measurement of malocclusion is considered as an index which is total controversy to the term "index" which is a numerical representation of qualitative measures. It starts from the Angle's Classification of Malocclusion, where malocclusion is classified based on qualitative and quantitative methods. The qualitative part of the classification includes describing the occlusal features along with descriptive classification of the dentition. However, it does not provide any information on the

treatment needs and outcome. Quantitative method measures the complexity and severity of the malocclusion appraised on a scale or proportion.[27,28] This reduces the subjectivity related to the diagnosis, outcome, and complexity assessment of orthodontic treatment. Angle in 1899 classified malocclusion into three types based on the molar relationship which is still in use with the disadvantage of the qualitative part which was not found adequate to measure the severity and treatment need. It was developed as a prescription for treatment planning, after which numerous classification methods evolved.

Critique

The WHO/FDI basic method was one of the first in use after Angle's classification and is used to recorded malocclusion using a well defined criterion, and the classification included five groups involving gross anomalies, dentition, space conditions, occlusion, and treatment needs.[29] This classification was developed with the objective of measuring the prevalence of malocclusion and requirement of treatment needs of the population, so as to plan essential orthodontic services. During the 1950s and 1960s, many occlusal indices were introduced. The Handicapping Labiolingual Deviation Index by Draker was the first index to measure cleft palate and other traumatic deviations along with other malocclusions.[29] Several indices developed later, but the most commonly used orthodontic indices are the Dental Esthetic Index (DAI) and Index of Orthodontic Treatment Need (IOTN). DAI was given by Naham C. Cons, J. Jenny, and K. Kohout in 1986. The development of DAI employed rating of the public of the esthetics of 200 occlusal conditions found in a population of half a million people. The index is refined by factor analysis and stepwise regression which developed the criteria for the index.[29] The absence of evaluation of occlusal abnormalities like buccal crossbite, impacted teeth, central line discrepancy, deep overbite, no record of missing molars, and no differentiation between varying degrees of arch length are few constraints of this index.10 IOTN was developed by Brook P and Shaw W in 1989. It is a widely used index in orthodontics to assess malocclusion in adults and children alike. The index has two components: (i) dental health component and (ii) esthetic component. There is a discrepancy between these two components as the esthetic component focuses only on the frontal view which is prone to subjective interpretation. The index is deemed to be complex to record as it includes five scales with 30 subcategories. Therefore, in order to efficiently utilize this index in recording malocclusion, proper training with calibration exercises is a prerequisite. To overcome these limitations, the index was modified with simplified recording of the index with improved validity and reliability values. Using the modified IOTN, every case with IOTN DHC $\geq$ 4 and/or IOTN AC $\geq$ 8 is classified as being in need of treatment.[30] IOTN has gained international recognition as a method of objectively assessing treatment need. It is objective and synthetic and allows for comparison between different population groups[31] To summarize, literature does not recommend an index that accurately measures malocclusion. As there is a subjective component to measure this condition, this really challenges the existing methods of classifications. Therefore, it is recommended to follow the current practice of recording malocclusion using Angle's classification for clinicians, and IOTN can be better suited for epidemiological surveys.

Critical Evaluation of Periodontal Indices

Periodontitis is a chronic inflammatory condition caused by infection of the supporting soft tissues of the periodontium. The commonly used periodontal indices are classified based on four categories – indices to measure pocket depth and clinical loss of attachment (LOA), to measure periodontal diseases, for measuring gingival recession, and indices using radiograph to measure bone loss.10 Among these, the most common indices used in clinical studies and epidemiological surveys are Periodontal Index (PI), PDI, Gingival PI (GPI), Gingival Bone Count Index (GBCI), Community PI for Treatment Needs (CPITN), Community PI (CPI), Basic Periodontal Examination Index, and Periodontal Screening and Recording index (PSRI).10

Critique

One of the first indices to measure periodontitis was the

PI which was developed based on data published by Sandler and Stahl (1954) which compared gingival recession scores with individual scores for bone loss using X rays and concluded that for individuals, estimates of recession were unreliable in the diagnosis of bone loss.[10] It is a clinical modification of Russell's PI. The PI being a composite index records both the reversible and irreversible changes in the periodontium.[32] This index is simple and precise but has the disadvantages of underestimating the true level of periodontal disease, the number of periodontal pockets without obvious supragingival calculus, overlapping of scores and sometimes, the requirement of radiographs for the assessment of bone loss.[10] However, the major drawback is the index cannot measure the degree of periodontal tissue destruction due to which the modern periodontal researchers consider the index to be invalid.[33] Still, the use of PI in epidemiological surveys can be useful, since more data can be assembled using this index.[33]

The PDI provides data which is useful in clinical research, pocket formation, and LOA. The major disadvantage of PDI is that it does not differentiate loss of periodontal support by periodontitis or by atrophy.[10] The GPI is a modified form of PDI and is used for screening purposes.[32] This index is also used to monitor patient progress and in epidemiological surveys. The GBCI is an index used to record gingival conditions and level of the crest of the alveolar bone.[10] This index can differentially record gingival and bone conditions compared to other indices. The bone loss is assessed by clinical examination, but the use of radiographs is suggested for accurate measurement.[33] Contrary to other indices, CPITN is used primarily to study and assess periodontal treatment needs instead of determining cumulative periodontal status.[34] The advantage is the simplicity in scoring with the use of minimal equipment. Compared to PDI which is more time consuming, CPITN records periodontal conditions in a simpler manner without much time. The disadvantage is that it does not record irreversible changes, and hence, it is not used as a diagnostic tool.[10] The modification of CPITN is CPI in which there is an inclusion of "LOA" with the elimination of "treatment needs." It is one of the commonly used diagnostic tools in epidemiological surveys. The inclusion of LOA avoids the false scoring of pseudo pockets (deepened sulci associated with tooth eruption)[18] The PSRI is used for screening individuals in a large population. This is a rapid method to screen individuals since only six scores are recorded. The index cannot be applied to children as it does not differentiate pseudo pockets which is a major disadvantage in screening of individuals.[35]

Critical Evaluation of Fluorosis Indices

Dental fluorosis causes a change in appearance of normal enamel. The difficulty to differentiate between fluoride and other enamel defects led to the evolution of indices for enamel defects without consideration for etiology. However, with the importance fluorides have gained in dentistry the differential diagnosis of non-carious lesions needs to be considered. Russell in 1961 proposed criteria to differentiate between mild fluorosis and enamel opacities.[36] Beginning from the work of F. McKay in 1901, the understanding and science of fluorides and fluorosis have come a long way. Many attempts to quantify the disease have been both for clinical use and epidemiological purposes. Dean's index, despite being the oldest, is still widely used. The need to further refine the stages of fluorosis resulted in modification and development of other indices described below.

Critique

Dean originally in 1934 classified fluorosis into a seven point scale and later in 1942 clubbed severe and moderately severe into one category.[37] Although still in use, Dean's index is criticized for a number of reasons. The criteria to differentiate enamel opacities are not clearly provided. The term "questionable" has created confusion among investigators as the rationale of using this term is unclear. The role of staining has been largely discounted in application of this index. The usage of "surfaces" and "teeth" interchangeably in scoring criteria has also resulted in ambiguity. The use of the most severely affected tooth as the score for the whole dentition may misclassify an individual, if esthetic considerations are more important than biological ones,

since the most affected teeth tend to be posterior ones and those who have less cosmetic importance than anterior teeth. It does not permit determinations of possible changes in the level of fluoride exposure during tooth development.[37] Most importantly, the index is sensitive to lower grades of fluorosis but puts severe in one category. The Thylstrup and Fejerskov Index (TFI) was proposed to refine, modify, and extend the original concepts established by HT Dean and to make the index more sensitive. It corresponds closely to histological changes that occur in dental fluorosis. Dean's category of "severe" was classified into five stages in this index making it more sensitive to higher grades of disease. The process of drying the tooth before examination also made identification of questionable cases easier.[37,38]

Another index developed to overcome the shortcomings of Dean's index was the Tooth Surface Index of Fluorosis.[39] Unlike TFI, drying of tooth before examination was not done as the index was proposed keeping in mind the natural moist appearance of teeth when fluorosis was studied for esthetic reasons. The absence of questionable category eliminates ambiguity in scoring as the first sign of fluorosis is scored. The index is more sensitive than Dean's index for severe conditions of fluorosis. The scoring is based on the surfaces affected rather than tooth alone thus making it correlate better with time of exposure. One of the limitations of this index is examiner reliability due to the need to score 72 surfaces including lingual areas.[37] The Fluorosis Risk Index (FRI) was developed by Pendrys in 1990 to investigate risk factors for fluorosis by identifying associations between age specific exposures to fluoride sources and development of enamel fluorosis.[40] FRI divides the buccal and occlusal surfaces of each permanent tooth, excluding the third molars, into four scoring zones, and based on the age at which calcification begins, each zone is assigned into one of two classifications (I and II). Although this index addressed the linkage between fluoride exposure and fluorosis, performing the index was a complex task taking into consideration its biological perspective and application. Hence, the use of this index was restricted to analytical studies on fluorosis.[37]

Critical Evaluation of Indices Used for Enamel Defects

Over the course of 50 years, various indices have been developed for measuring enamel defects, including fluorosis. Conflicting views on categorizing fluoride and nonfluoride defects led to the development of two different approaches to measure enamel defects. Various criteria were developed to first distinguish between fluoride and nonfluoride defects and then record fluorosis only with specific fluoride indices. Difficulty in distinguishing fluoride and nonfluoride defects led to the development of a second approach which uses pure descriptive criteria to record all defects seen without assigning any etiology to them.[10]

Critique

The descriptive classifications are based on the principle that any condition will be recorded after the criteria are defined and will depend on the definition of these criteria, not based on any etiology. The widely used among these indices is the Developmental Defects of Enamel (DDE) developed by "FDI – Commission on Oral Health, Research and Epidemiology" in 1982. This index removes the need for diagnosing fluorosis before recording the enamel opacities. In the United Kingdom, DDE has been the most frequently used index. However, since it is not fluorosis specific, it is difficult to analyze the prevalence of fluorosis from this index. The index has multiple coding system, and examination of each tooth surface is required making the DDE index, time-consuming, and complicated to use. According to Clarkson, 1987, the index was unable to record the severity of defects. Therefore, a modification of this index was developed by Clarkson and O'Mullane in 1989. This modification will record the developmental enamel defects without the need for diagnosing fluorosis before recording enamel opacities. It was straightforward and adaptable when compared with DDE Index.41 Young's classification to quantify enamel opacities was developed in 1973. However, the criteria did not cover the full range of defects, and there was no attempt to differentiate between the demarcations of opacities. A similar classification was developed by Al-alousi and Jackson which was simple

to use and is shown to have high sensitivity.[42] Another classification was developed by Murray J. J and Shaw L based on Young's classification with two modifications in 1979.[43]

Critical Evaluation of Indices Used for Assessing Tooth Wear

Multiple tooth wear indices have been developed for clinical and epidemiological use. Unfortunately, the presence of so many indices makes it difficult for ready comparison of results between studies. The ambiguity in literature is generated as a result of researchers attempting to quantify the amount of tooth tissue loss concentrating on etiology alone. Hence, these indices tend to be restricted to certain surfaces of tooth.

Critique

Smith and Knight presented the concept of measuring tooth wear fundamentally, irrespective of the etiology, which paved the way for other indices. The Tooth Wear Index is a comprehensive framework whereby every one of the four surfaces (buccal, cervical, lingual, and occlusal-incisal) of all teeth present is scored for wear, independent of etiology. However, the drawback of this index was that it required computer assistance and was time consuming.[44]

Bardsley et al. pioneered a new simplified version of the Tooth Wear Index where the scoring was dichotomized into the presence or absence of dentine, with even cupping of dentine scoring one. Some debate still exists regarding the significance of dentinal cupping when exposed dentine does not relate to significant amounts of tissue loss.[45] Review of the literature reveals multiple indices for assessing tooth wear, with lack of standardization in terminology. Till date, there is no one ideal index that exists which can be used for epidemiological prevalence studies, clinical staging, and monitoring[46]

Conclusion

Over the years, several indices and their modifications have been developed. The quest for a perfect index still continues. However, indices will continue to be used in dental practice as an important and integral tool.

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