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Oral Health Related Quality of Life

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1. Introduction

Data about the impacts on people´s life caused by oral condition has been gathered recently in the last decades. Functional consequences of oral disease have been documented and also the emotional and social ones. It is accepted and recognized by dental community that oral health status can cause considerable pain and suffering, if oral symptoms remain untreated would be a major source of diminished quality of life; disturbing people´s food choices or their speech, or may lead to sleep deprivation, depression, and multiple adverse psychosocial outcomes. Influencing how people grow, enjoy life, chew, taste food and socialize, as well as their feelings of social well-being. There are so many oral affections that impact negatively on quality of life like caries, periodontal disease, tooth loss, cancer, dental injuries, dental fluorosis, and dental anomalies, craniofacial disorders among others. In fact not only dental disease but also treatment experience can negatively affect the oral health related quality of life. The relationship among these anomalies or conditions with quality of life are recently findings in literature in different populations. To evaluate these impacts different instruments have been developed for pediatric and adult population.

2. Oral health concept

2.1. Health

If there are complexities in defining disease, there are even more in defining health. Definitions have evolved over time. In the biomedical perspective, early definitions of health focused on the theme of the body's ability to function; health was seen as a state of normal function that

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could be disrupted from time to time by disease. An example of such a definition of health is: "a state characterized by anatomic, physiologic, and psychological integrity; ability to perform personally, in family, work, and in community roles; ability to deal with physical, biologic, psychological, and social stress". Then, in 1948, the World Health Organization (WHO) proposed a definition that aimed higher, linking health to well-being, in terms of "physical, mental, and social well-being, and not merely the absence of disease and infirmity". Although this definition is most accepted one it is also criticized as being vague, excessively broad, and unmeasurable.

This brought in a new conception of health, not as a state, but in dynamic terms, in other words, as "a resource for living". [1] The WHO in 1984 revised the concept of health and defined it as "the extent to which an individual or group is able to realize aspirations and satisfy needs, and to change or cope with the environment. Health is a resource for everyday life, not the objective of living; it is a positive concept, emphasizing social and personal resources, as well as physical capacities". [2] Thus, health referred to the ability to maintain homeostasis and recover from illness. Mental, intellectual, emotional, and social health referred to a person's ability to handle stress, to acquire skills, to maintain relationships, which are important for resources for resiliency and independent living. As seen the concept of health is wide and the way we define health also depends on individual perception, religious beliefs, cultural values, norms, and social class.

2.2. Oral health

As in 1948 WHO expanded the definition of health to mean "a complete state of physical, mental, and social well-being, and not just the absence of infirmity", oral health concept followed this change aiming not minimized oral health as having or not caries. So the concept of oral health (OH) has changed over time, going from a biologist approach, in which the oral cavity contributes to protect the body from infections by chewing and swallowing, to a social and psychological approaches, that take into account other roles of the oral cavity as the contribution that it has in self-esteem, communication and interaction and facial aesthetics. There is a concept of oral health defined by Dolan, who mention that OH means "a comfortable and functional dentition which allows individuals to continue in their desired social role." [3]. This definition already includes the role of OH in the performance of daily activities of the individual. With this we see that oral health is not just a medical condition, but an aggregate of aspects such as the impact that pain may have in daily or the degree of disability or dysfunction. Nowadays the importance of the oral cavity is recognized, as vital part of the human body. It is conceptualized as not only the teeth but others structures as gums, supporting tissues, ligaments, bone, hard and soft palate, soft mucosal tissue tongue, lips, salivary glands, chewing muscles, jaws, and the temporomandibular joints.

Similarly, the Canadian Dental Association defines oral health as "a state of the oral and related tissues and structures that contributes positively to physical, mental and social well-being and enjoyment of life's possibilities, by allowing the individual to speak, eat and socialize unhindered by pain, discomfort or embarrassment". Oral Health and oral cavity should be viewed as a part of a complete body, we must see human beings and their activities and not teeth and

tooth decay, thus to recognized the play that oral health has on daily life activities. Clearly, there is an interaction between how we experience quality of life and how we perceive our oral health.

3. Health Related Quality of Life (HRQoL)

The term "quality of life" (QoL) was first used by the British economist Arthur Cecil Pigou in 1920. Later, after World War II, this term was expanded into other areas such as sociology, politics [4] and health, among others. Within the area of health the concept of quality of life was introduced and initially applied in patients with neoplastic disease [5], having a peak in the 90s and essentially incorporating the patient's perception. 4

The World Health Organization (WHO) in 1952 defined the concept of QoL, as "the proper and correct perception that a person has of itself in the cultural context and values on which it is embedded, in relation to its objectives, standards, hopes and concerns. [6]

This perception may be influenced by their physical, psychological, level of independence and social relationships. [7] Later it was considered good health and quality of life to "the absence of disease or defect and the sense of physical, mental and social well-being" or "personal sense of well-being and life satisfaction." Another proposal definition in 2003 by Ventegodt is "to have a nice life and live a life of high quality." [8] Later on it was postulated that "the quality of life has to do with the degree to which an individual can enjoy the possibilities of life". This concept was proposed by the Centre for Health Promotion, University of Toronto. [9]

The variety of definitions and the lack of consensus lead us to think that the term quality of life is only understood on a personal level or as Campbell mentioned: "The QoL is a vague and ethereal concept, something that many people talk about but anybody knows clearly what it really means. [10]

On the other hand, all the above definitions are general definitions of quality of life and not quality of life related to health (HRQoL). Furthermore, it becomes evident that these terms within the medical field have been used interchangeably. Strictly research in the field of health should address processes or limit the scope of the study quality of life related to health, which refers to the effects that the sufferings directly or these treatments can occur in people. [11, 12] HRQoL is the quality of life that relates directly to the state of health of the individual. It is clear and recognized that HRQoL refers to something much broader than health.

The HRQoL assessment in a patient represents the impact that a disease and its subsequent treatment has on the patient's perception of their well-being. One of the existing definitions consider HRQoL as "the subjective assessment of the influence of health status, health care and health promotion on an individual's ability to maintain a level of functioning that allows him to perform activities that are important, and affect overall welfare." [8]

Or, as Patrick and Erickson proposed, HRQoL is the "extent to which the value assigned to duration of life in terms of the perception of physical, psychological, social and diminishing

opportunities limitations because of illness value is changed, its sequelae, treatment and / or health policy ". It has also been conceptualized as "the subjective perception, influenced by the current health status, ability to perform those activities important for the individual".4

For this assessment it has been proposed that the most important dimensions of HRQoL are: social, physical and cognitive functioning, mobility and personal care and emotional wellbeing.

HRQoL is an important subjective component so it will depend on the relationship that each individual has with his life. This concept will vary and depend largely on the perception that people has about their physical, mental, social and spiritual state, largely depending on their own values, convictions and beliefs, as well as their personal cultural context and history. [13]

Given the above, to assess HRQoL should be considered the values in which each person lives, that is, the cultural context in which he is immersed, and in the individual expectations and achievements. Similarly, the perception of HRQoL is not equal over time because people change their expectations and aspirations adjusting them to different circumstances.

Clinicians interested in knowing the effects of interventions or treatments also find useful information on HRQoL, as it evaluates the final result of medical interventions at one point, not assessing only according to biological or physiological standards but at emotional and social functional level, it means to evaluate everything that a person represents.

Similarly, this information is also relevant to patients and family members making them aware of areas where their performance is affected by their health, identifying where they may need further help or therapy or supporting them to choose between various options of treatments. Moreover, it has been identified that the assessment of HRQoL in children can be used as a predictor of costs of health care and can help to identify risk groups or to evaluate health services. [14, 15].

4. Oral Health Related Quality of Life (OHRQoL)

Although oral health problems are rarely a matter of life and death they remain a major public health problem because of its prevalence and there are significant indications that oral health problems have social, economic and psychological consequences, this means that they have impact of quality of life.

Nowadays there is a growing interest in recognizing oral health as a component of quality of life, currently the dental research efforts are not only focus on rehabilitating oral-dental diseases, but in exploring the relationship between oral health status and quality of life, in order to evaluate it, improve it and maintain it. In fact, OHRQoL is an integral part of general health and well-being and is recognized by the WHO as an important segment of the Global Oral Health Program. [16]

Oral health-related quality of life was defined as a "self-report specifically pertaining to oral health–capturing both the functional, social and psychological impacts of oral disease" [17]

There is another definition that conceptualizes OHRQoL mentioning that it "reflects people's comfort when eating, sleeping and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health". Locker suggested that it is the result of an interaction between and among oral health conditions, social and contextual factors [18] and the rest of the body as Atchison mentioned. [19]
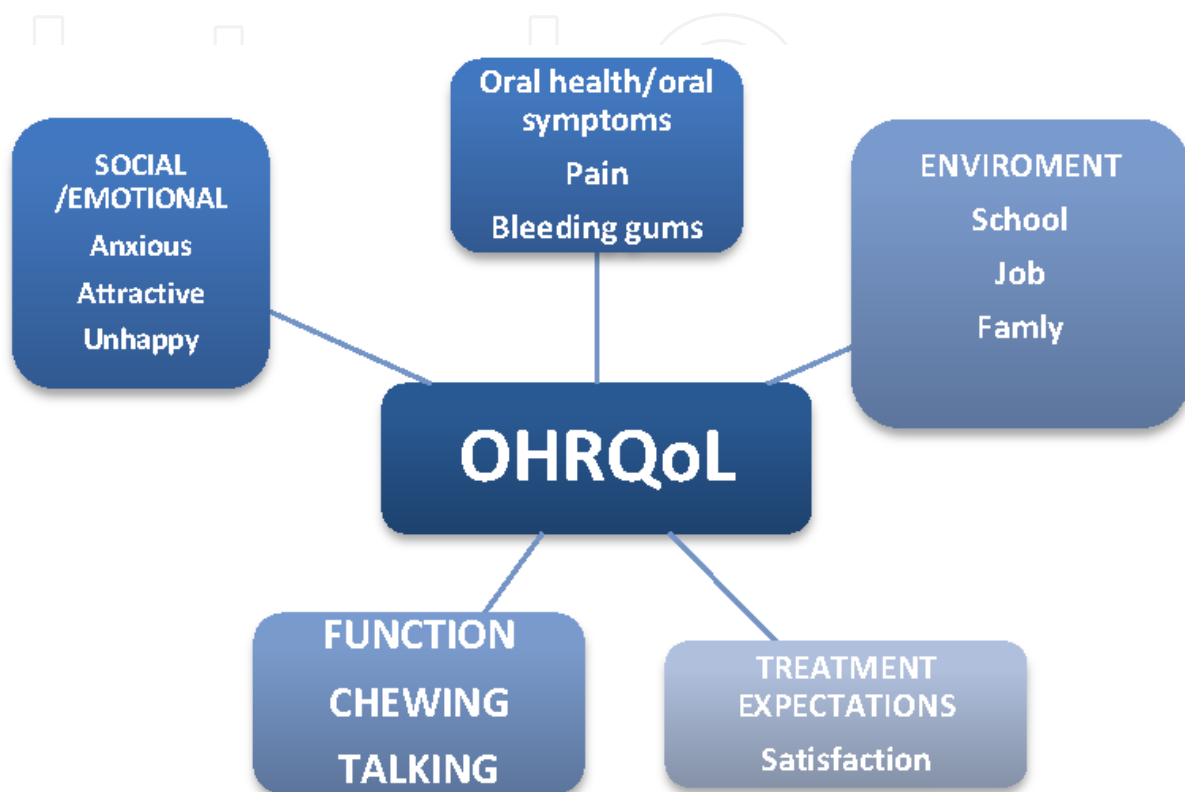
We must keep in mind that OHRQoL deals with conditions that vary in intensity and impor‐ tance, some of them are life-threatening (e.g. oral cancers) some chronic (caries, periodontitis, etc.) some other dealing with aesthetics (fluorosis, dental anomalies, etc) and other are related to oral pain (pulpitis, dental treatments etc.).

As HRQoL oral health related quality of life is highly subjective and has to be assessed within the framework of patients' conditions, sociocultural environments and own experiences and states of mind: because OHRQoL is related to daily life and is unique to each individual, even patients with severe conditions can report having good quality of life. Furthermore, Quality of Life is by itself multi-faceted, showing variation over time for each individual. [20]

A long the time several oral conditions have been reported in literature as conditions having impact on OHRQoL. An example is **edentulism**, condition that can affect masticatory function, dietary choice, and nutritional level. It has been reported that wearing dentures may interfere with the ability to eat satisfactorily, talk clearly, and laugh freely.

Tooth loss is one of the worst types of damage to oral health, causing esthetic and functional problems. In addition to the biological causes of tooth loss, socioeconomic factors contribute to oral health associated with tooth loss. Socioeconomic status is related to inequalities in

health, and socioeconomically disadvantaged people have higher risks of disease and suffer more from health conditions. [21] Several studies have reported an association between tooth loss and OHRQoL.

Some other common oral conditions, such as caries, periodontal disease, which are almost universal in prevalence, and which are chronic but with acute recurring episodes, also impact on QoL. In the same way other condition that might not be as common as the ones mentioned before but which prevalence cannot be considered low as dental fluorosis, craniofacial disorders and oral cancer which can be life treating.

There are several reports showing that **dental caries** has negative impacts on OHRQoL in populations of various ages across the globe, in children [22] and adults. Specially, children with caries whose scores can be about 50% greater than scores for children without caries [23]. Among toddlers and preschool-age early childhood caries (ECC) is one of the most common health problems among children with periodontal disease have lower OHRQoL compared with the general population

Another alteration that affects quality of life is **malocclusio**n. Authors as Onyeaso and Aderinokun in 2003, who conducted a study involving 614 Nigerian children aged 12-18 years, found a correlation between the malocclusion severity and the perception that children have about their dental appearance.

There is an association between the presence of malocclusion with worse OHRoQL. Particularly the one related to lack of space, facial pain has adversely effects of body image, social interaction and daily behavior of the individual. Given the fact that face and mouth appearance influence judgments of facial attractiveness, playing an important role in the development of social and occupational goals. Not only malocclusion but also its treatment has an effect on OHRQoL may also affect QoL through their effect on function and esthetics.

For instance, reports have been made demonstrating striking changes in self-concept and emotional health after **orthodontic and/or surgical treatment** of malocclusions and orofacial defects.

Another alteration that has an impacto n OHRQoL is severe **hypodontia**. It was associated with worse quality of life. Wong and cols. observed that 100% of children reported having impact in the area of oral symptoms, functional limitations in 88%, 55% to 100% emotional and social welfare. The number of missing teeth was associated moderately with the level of impact. One of the main impacts of OHQRL noted in literature was the difficulty chewing, especially among the elderly.

In Uganda, a study aiming to describe the OHRQoL in 12 years of age rural children showed that more than half of them reported oral impact "often" or "every day". Authors concluded that the presence of caries experience or treatment were associated with higher impacts on quality of life. The socially significant fluorosis was associated with greater number of impacts, but not with higher total scores. Despite low levels of oral problems these children experienced impacts on quality of life due to oral problems. Finding that most responsible for these impacts is the presence of caries and fluorosis a lower level. Also **severe fluorosis** can have a negative

effect on smile aesthetics and produce functional problems, affecting self-confidence, causing discomfort, and probably disturbing social roles from a young age. [24]

Also **craniofacial disorders** cause impact on OHRQoL including limitations in verbal and nonverbal communication, social interaction, and intimacy. Individuals with facial disfigurements due to craniofacial diseases and conditions and their treatments may experience loss of self-image and self-esteem, anxiety, depression, and social stigma; these in turn may limit educational, career, and marital opportunities and affect other social relations. Diet, nutrition, sleep, psychological status, social interaction, school, and work are affected by impaired oral and craniofacial health.

Documented data, reported in Thailand, suggest that in ninety per cent of pre-adolescents have an impact related to oral health, 74% of 35–44-year olds had daily performances affected by their oral state; 46% reported their emotional stability was affected. Earlier, end points such as recurrence rates and survival were used to evaluate the efficacy of various therapeutic measures in head and neck cancer while patient's quality of life was usually ignored. Presently, the multitudinal impact of maxillofacial tumors on a patient's life has been recognized, which led various researchers to investigate the quality of life of those patients. However, studies evaluating the quality of life of patients with maxillectomy defects and the effect of prosthodontic therapy with obturator prostheses on their quality of life remain rare. A obturator prosthesis is a highly positive and non-invasive approach to improve the quality of life of patients with maxillectomy defects. [25]

Andiappan and cols. performed a meta-analysis and revealed that those receiving treatment for malocclusion and in individuals without malocclusion have significantly better OHRQoL compared to those with such condition [26]

Recent studies of the impact on OHRQoL on children's under general anesthesia treatment have shown significant improvement in oral health and psychological, social and overall wellbeing as well as a positive impact on the family.

Besides clinical conditions, there are other factors that contributed in the impact on OHRQoL as lower family income and sex. In general, women reported a greater impact on OHRQoL than men, although no differences are observed between clinical conditions present in each gender. Differences in the perception of OHRQoL between the genders may be caused by individual and subjective concepts related to beauty and personal esthetic standards, imposed by the social demands and personal needs [27].

5. Instruments to assess OHRQoL

As aforementioned, in the literature has been identified OHRQoL as a multidimensional construct containing physical, social and psychological domains. [28] The clinical indexes do not evaluate these aspects, they only measure the presence and severity of illness, and give scarce consideration to the functionality of the oral cavity as a whole, or to the impact of the symptoms on the patients' quality of life. So the clinical indexes that are commonly used to

establish the presence and severity of pathological conditions should be complemented with indicators of social and emotional aspects related to the individual experience and subjective perception of changes in the patients' physical, mental, and social health. [29]

Over the years several socio-dental indicators have been developed, since Cohen and Jago first advocated the development of sociodental indicators. These indicators range from single item to composite inventories or scoring systems, covering the aforementioned OHRQoL domains. So since the 70's, several authors have been given the task to develop and test instruments that may assess the functional, emotional and social effects of oral abnormalities.

All these questionnaires around the world have been developed to measure the impact of oral disease on quality of life which comprising different domains including: pain and inability to perform normal functions of the mouth, sleep disturbances, loss of school days, degree of emotional and social wellbeing. These questionnaires could also potentially be a valuable outcome for evaluating oral health promotion programs and/or service initiatives. 30

5.1. OHRQoL instruments for adults

5.1.1. The Social Impacts of Dental Disease (SIDD) [31]

The SIDD developed in the early 1980s, was one of first socio-dental indicators. Created under a model that defines dental health status in socio-dental terms; the clinical indicators are largely determined by vulnerability whilst the social elements are more directly linked with the degree of social and psychological impact arising from dental diseases. The indicator was tested on large randomly selected samples of industrial workers in Warrington, in the North of England and skilled manual workers and their wives in the South of England.

It was developed as a component of a much broader socio-dental model of dental disease and health behavior so that both the clinical and socio-psychological aspects could be considered within an integrated framework. The model assumes that an individual's present oral health status and treatment needs are influenced by an interplay of three 'dimensions' of background and behavioural factors, namely vulnerability, motivational and preventive dimensions. The score for each individual was constructed from responses to questions relating to those five categories. A total impact score is derived by adding the number of categories. A score of 1 is given to the impact category if a positive response has been given to any of the questions in the category. Two total impact scores were used, one including (total score 0-5) and one excluding discomfort (totaL score 0-4) to see the difference if this relatively common problem was excluded.

5.1.2. Geriatric (General) Oral Health Assessment Index (GOHAI) [32]

The GOHAI is one of the most commonly used scales in assessment of OHRQoL it was developed by Kathryn Atchison and Dolan in 1990 in the USA for use with elderly populations. It is compounded by 12-items developed with three months' time reference, with five (six in the original) Likert scale options, scoring as 'often', always', 'seldom 'or 'sometimes' and 'never' reflecting the aspects that are considered to have an impact upon the quality of life of

the older population. Nonetheless it was created for geriatric populations some author have used it with younger adult populations, which is reflected in the interchangeable us of the names Geriatric or General Oral Health Assessment Index. It was developed to evaluate three dimensions of OHRQoL including physical functions like eating, chewing, speech, swallowing; psychosocial functions like worry, limitations and discomfort with social contacts, dissatisfaction with appearance; and self-consciousness about oral health, pain or discomfort including the use of medication or discomfort from the mouth. The GOHAI score is determined by summing the final score of each of the 12 items.

The GOHAI gives a greater weight to functional limitations or pain and discomfort. According to the research of Hassel et al., the GOHAI seems to be more appropriate when focusing on subjective oral health with minor clinical changes and immediate clinical aspects. [33]

This questionnarie has been tested on a variety of sample of subjects, of different ages, races and the reliability testes show that this instrument is acceptable in all samples tested thus far. It has also been translated and validated to a wide range of languages.

5.1.3. The Dental Impact Profile (DIP) [34]

This instrument was developed by Ronald Strauss. It consist in twenty-five items that have been placed in non-apparent order and respondents are offered three ordinal response choices (good effect, bad effect, no effect) about whether teeth or dentures have had an effect on various aspects of life. A response of "good effect" was seen as likely to be most socially acceptable and the potential for response bias in the positive direction exists. While "good effect" and "bad effect" response categories have meaning independently, they may be combined in the estimation of dental impact. Dental impact is noted for an item if teeth are seen to have an effect on that aspect of life, whether that effect is positive or negative. Responses of "no effect" are seen as indication of no dental impact. The four subscales and component items were:

1. Eating Subscale: Eating, Chewing and Biting, Enjoyment of eating, Food choice, Tasting

2. Health/Well-Being Subscale: Feeling comfortable, Enjoyment of life, General happiness, General health, Appetite, Weight, Living a long life

3. Social Relations Subscale: Facial appearance to other people, Facial appearance (to self), Smiling and laughing, Moods, Speech, Breath, Confidence around others, Attendance at activities, Success at work

4. Romance Subscale: Social Life, Romantic relationships, Having sex appeal, Kissing,

5.1.4. Dental impact on daily living (DIDL) [35]

Developed by Leao & Sheiham in 1996. The Dental Impact on Daily Living (DIDL) is a socio-dental measure which assesses five dimensions of quality of life comfort, appearance, pain, daily activities, eating. Comfort, related to complaints such as bleeding gums and food packing; Appearance, consisting of self-image; Pain; Performance, the ability to carry out daily activities and to interact with people; and Eating restriction, relating to difficulties in biting

and chewing. The measure consists of a questionnaire of 36 items, which assesses the oral impacts on daily living, and a scale, which is a graphical representation of a method developed by Leao to assess the importance respondents attribute to the different dimensions involved. Items are summed into a score for each dimension. To compute the score, coded responses within each dimension were summed and divided by the number of items, resulting in a dimension score (For example, Appearance has four questions. The score for this dimension would be the sum of coded responses for all four questions divided by four). Impacts were coded as '+1' for positive impacts, 0 for impacts not totally negatives and '-1' for negative impacts. To construct a final score, questions within each category are summed and divided by the number of items, giving a score for each dimension. Before adding the different dimensions, they receive the respective weight attributed on the scale, otherwise it would be assumed that they were equally important. Then the five dimensions are finally added to give a final score.

One aspect to be highlighted in DIDL is the degree of flexibility offered in terms of aggregating and disaggregating data (either individual items, dimension scores or total score). Although criticized, a total score reproduces the total impact subjects are experiencing, and since dimensions sometimes may not impact separately, it appears important to have this view of the individual as a whole. Another point to be stressed is that in the total score generated by DIDL, weights attributed to dimensions (by each respondent) are personal. That is, the importance attributed to a dimension by a given individual is directly associated with his or her own impacts on that dimension. [36]

5.1.5. Oral health quality of life inventory

Developed by Cornell et al. in 1997, they included 56 questions divided 4 domains: oral health, nutrition, self-rated oral health, overall quality of life. It is part of a larger home-based interview, the Oral Health Quality of Life Interview (OHQOLI)*. In addition to the OH-QoL, OHQOLI includes self-report assessments of oral health and functional status (SROH), a Nutrition Quality of Life Index (NutQoL), and an interview version of the Quality of Life Inventory (QOLI). [37] The final OHQOLI interview has 40 SROH items, 15 OH-QoL items, and 9 NutQoL items. The OH-QoL items are distributed among the related SROH items. Thus, the subjective well-being items appear immediately following the related objective functional status items in the questionnaire. The overall format of the OHQOLI is designed for interviewer administration.

5.1.6. Oral Health Impact Profile (OHIP) [38]

The OHIP, developed by Slade & Spencer is the most widely used OHRQoL questionnaire. It is based on Locker's adaptation of the World Health Organisation's classification of impairments, disabilities and handicaps (Locker, 1988). The OHIP contains 49 assessing seven dimensions of impacts of oral conditions on people's OHRQoL including functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap.

A short version, OHIP-14, was later developed based on a subset of 2 questions for each of the 7 dimensions. [39] It is patient-centered, gives a greater weight to psychological and behavioral outcomes, is better at detecting psychosocial impacts among individuals and groups, and better meets the main criteria for the measurement of OHRQoL.[33] The OHIP 14 responses, "never", "hardly ever", "occasionally", "fairly often", and "very often", were codified from 0 to 4, respectively. Each of the 14 questions was assigned a score of 0 if the response was "never," and a score of 1 if the response was "hardly ever", "occasionally", "fairly often," or "very often," dichotomizing responses into no impact versus some impact. The scores assigned to the responses to the 14 questions are added to obtain values between 0 and 14. [40]

There also exist the OHIP-aesthetic which is a modified short form of the OHIP derived (OHIP-conceptual) that is most favorable in discriminating dental aesthetics, showing to be reliable and most sensitive to the dental aesthetics intervention-tooth whitening. [41]

5.1.7. Oral Impacts on Daily Performance (OIDP)

The OIDP aims to provide an alternative sociodental indicator which focuses on measuring the serious oral impacts on the person's ability to perform daily activities. It is one of many self-reported inventories to assess OHRQoL in terms of adverse impacts that oral conditions can have on everyday life experiences.
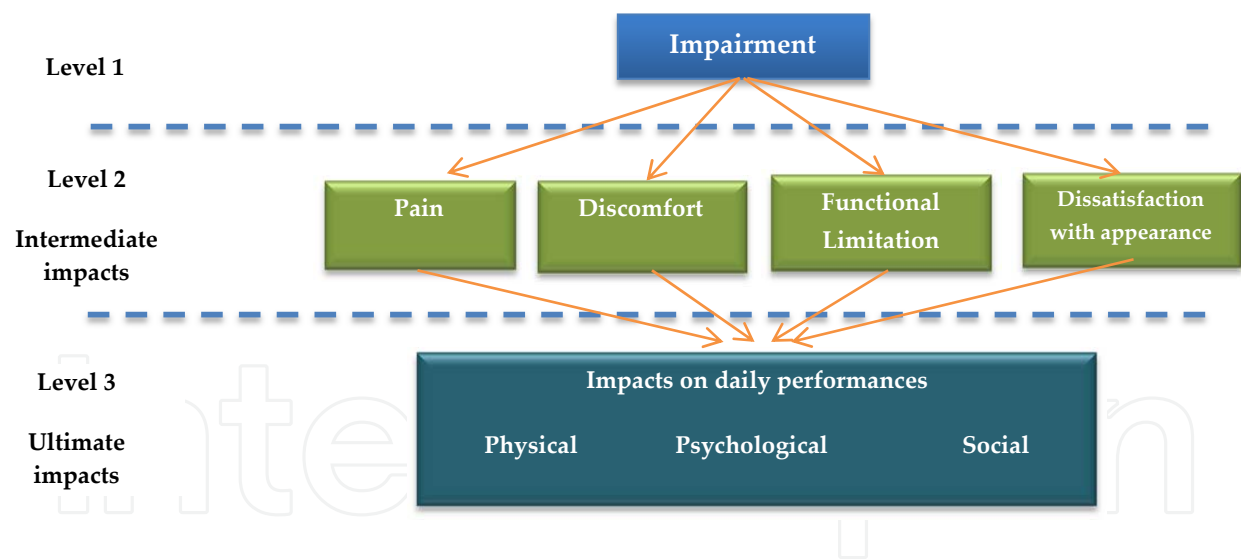

Figure 1. Theoretical framework of consequences of oral impacts

The theoretical framework of OIDP is presented in Figure 1. This is a modified model from the WHO International Classification of Impairments, Disabilities and Handicaps amended for dentistry by Locker. [42] In this modification different levels of consequence variables were established. The first level refers to the oral status, including oral impairments, which most clinical indices attempt to measure. The second level, "the intermediate impacts", includes the possible earliest negative impacts caused by oral health status: pain, discomfort or functional limitation. Dissatisfaction with appearance was added in this level since studies indicated that

it was a major dimension of oral health outcomes. In addition, functional limitation may cause pain, discomfort or dissatisfaction with appearance and vice versa. The third level, or the "ultimate impacts" represents impacts on ability to perform daily activities which consists of physical, psychological and social performances. Any of the dimensions in the second level may impact on performance ability. This third level is equivalent to disability and handicap dimensions in the WHO model. The OIDP concentrates only on the measurement of "ultimate" oral impacts, thus covering the fields of disability and handicap.

The OIDP has been demonstrated to have appropriate psychometric properties when applied in population based cross-sectional surveys of elderly in Norway 43, Sweden 44, Greece and UK, Tanzania, Bosnia 45, Brazil, Thailand, among others. Studies have shown that OIDP is associated in the expected direction with self-reported oral health and clinical indicators and that personal-, socio-demographic-, and health care service related factors modify those relationships.

There are other questionnaires adapted to specific conditions/domains as the Orthognathic QOL Questionnaire, SOOQ for orthodontic surgery, OHRQOL for Dental Hygiene, The prosthetic quality of life (PQL), Quality of Life with Implant-Prostheses' (QoLIP-10)

5.1.8. The prosthetic quality of life (PQL) [46]

The PQL, created by Javier Montero and collaborators, is compounded by 11 items and can be applied in epidemiological studies or clinical trials with no special cost as regards the time required for exploration. It has a bipolar design of the responses of the items of the PQL that allows both negative and positive impacts to be recorded, such that the assessment of the physical, psychological and social well-being deriving from the use of dental prostheses, condition that makes it more complete than questionnaires limited to evaluating the presence of negative impact. Responses: Yes, a lot (1),Yes, slightly (2), It's more or less the same (3), I think it's worse (4), It's much worse (5).

5.1.9. Quality of Life with Implant-Prostheses' (QoLIP-10) [47]

Preciado and colaborators designed this instrumet of the 10-item scale that gather information on global oral satisfaction, socio-demographic, health-behavioural, clinical and prosthetic-related data. This questionnaire has shown to be reliable and valid. The factor analysis confirmed the existence of three dimensions and meaningful inter-correlations among the 10 items. The QoLIP-10 index confirmed its psychometric capacity for assessing the OHRQoL of implant overdenture and hybrid prosthesis wearers. Authors suggest that this instrument may be recommended for determining the influence of implant-retained overdentures and hybrid prostheses on the well-being of future patients.

5.2. OHRQoL instruments for children

During the past decade, several instruments have been developed to detect the impact of oral health on children's quality of life.

Questionnaire	Abbreviation	Original Language	Year	Validated in other languages as
Social Impacts of Dental Disease	SIDD	English	1980	
Sickness Impact Profile	SIP	English	1985	
The General (Geriatric) Oral Health Assessment	GOHAI	English	1990	French [48], German [49], Mandarin Chinese [50], Arabic [51], Swedish [52], Malay [53], Arabic [54], Turkey [55], Hindi [56] Spanish [57], Portuguese [58]
Dental Impact Profile	DIP	English	1993	
Oral Health Impact Profile	OHIP	English	1994	Korean, Chinese. Swedish, Portuguese, Japanese, Hungarian, Dutch, German, Hebrew, Croatian, Slovenian, Sinhalese, Persian, Italian
Dental Impact on Daily Living	DDIDL	English	1996	
Oral Impact Daily Performance	OIDP	English	2011	Portugues, Greece, Thai, Kannada [59], Swedish, Bosnian, Norwegian
	OIDP abreviado		2012	India [60], Albanian
Prosthetic quality of life questionnaire	**PQL**	English	2007	
Quality of Life with Implant-Prostheses'	**QoLIP-10**	English	2013	

Table 1. Questionnaires to asses OHRQoL in adults

5.2.1. Child Perception Questionnaire (CPQ11–14) [61]

In 2002, Jokovic et al. developed the Child Perceptions Questionnaire (CPQ), which is one of the first instruments used to evaluate OHRQoL in children. In addition to the CPQ, there is a Parent's Perceptions Questionnaire (P-CPQ) [62] and a Family Impact Scale (FIS) [63], which is compound a battery of instruments that provide information at different levels and perspectives for OHRQoL in children.

The CPQ has two versions, one is the CPQ_{11-14} for children from 11 to 14 years of age; the other, which is the CPQ_{8-10}, is for children aged 8 to 10 years. Both aim to evaluate the impact of oral and orofacial conditions in children at a functional, emotional, and social level.

The CPQ_{11-14} was constructed using a systematic multistage process based on the theory of measurement and scale development. It is one of the most used instruments which is composed of 37 items divided into four domains or subscales: oral symptoms (n=6), functional limitations (n=9), emotional well-being (n=9) and social well-being (n=13). The questions ask about the frequency of events in the previous three months in relation to the child's oral/oro-facial condition. The response options are: 'Never'=0; 'Once/twice'=1; 'Sometimes'=2; 'Often'=3;

'Everyday/almost every day'=4. The questionnaire also contains global ratings of the child's oral health and the extent to which the oral/oro-facial condition affected his/her overall well-being. They are worded as follows: "Would you say that the health of your teeth, lips, jaws and mouth is..." and "How much does the condition of your teeth, lips, jaws or mouth affect your life overall?" A 5-point response format ranging from 'Excellent'=0 to 'Poor'=4 and from 'Not at all'=0 to 'Very much'=4, respectively, is offered for these ratings.

The CPQ_{11-14} performs well as a discriminative measure, being able to distinguish between the three groups. Jokovic and co-workers developed short-forms versions of the CPQ_{11-14} using two different approaches. This resulted in developed two short versions to facilitate the administration of the questionnaire in clinical settings (16-item short-form) and in epidemiological surveys involving general populations (8-item short-form). Important to mention is that if an 8-item version could be used as an overall scale scores but not analysis is possible at the level of the individual domains. The number of items per domain is insufficient for this purpose. [64]

5.2.2. Child Perceptions Questionnaire 8-10 (CPQ 8-10) [65]

The CPQ_{8-10} contains 29 questions. The first two relate to demographic information; the next two pertain to global items; and the remaining twenty-five are divided into four domains: oral symptoms (OS), functional limitation (FL), emotional well-being (EW), and social well-being (SW). The questionnaire registers problems occurring during a prior four-week period. The responses are recorded in a Likert scale from 0 to 4, where 0=never; 1=once or twice; 2=sometimes; 3=often; and 4=every day or almost every day. The maximum score is 100, and the minimum is 0. For the global question concerning the general perception of oral health, the possible responses are 0=very good, 1=good, 2=OK, 3=poor. Regarding the second global question: How much does oral health affect daily living? With a scale as follows: 0=not at all, 1=a little bit, 2=some, 3=a lot.

Recently Foster and cols. suggested that these two questionnaires to be acceptable to be used in younger age group, since 5 years of age. They proposed to use a single questionnaire, CPQ_{8-10} or the short CPQ_{11-14}, to evaluated OHRQoL in children from 5 to 14 years of age [66], thus facilitating the use in prospective studies following children through different life stages.

5.2.3. Parental-Caregiver Perceptions Questionnaire — P-CPQ lxii and Family Impact Scale — FIS

The P-CPQ has 31 items distributed into 4 subscales: 6 oral symptoms (OS), 8 functional limitations (FL), 7 emotional wellbeing (EWB) and 10 social wellbeing (SWB). The questions refer only to the frequency of events in the previous 3 months. The items have 5 Likert response options: 'never=0', 'once or twice=1', 'sometimes=2', 'often=3', 'every day or almost every day=4'. A 'don't know' response also was permitted and scored as 0. Global ratings of the child's oral health and impact of the oral condition on his or her overall wellbeing were obtained from the parents/caregivers. The global ratings had a 5-point response format from 'excellent=0' to 'poor=4' for oral health and 'not at all=0' to 'very much=4' for wellbeing. The P-CPQ score is calculated by summing the response codes to all 31 items and dividing this sum by the number

of items for which a valid response is obtained. The P-CPQ was developed for use with younger children and provides a measure of a child's OHRQoL. Where both parental and child reports are used, the P-CPQ can be regarded as complementing the latter, thus providing a comprehensive profile of a child's health and well-being.

The FIS is included in the P-CPQ and consists of 14 items that attempted to capture the effect of a child's oral or oro-facial condition on four domains: related to parental and family activities with 5 questions, parental emotions (4questions), family conflict (4 questions) and family finances (1 question). The questions ask about the frequency of events in the previous 3 months. Response options for the four domains and the respective scores were: 'Never' (scoring 0); 'Once or twice' (1); 'Sometimes' (2); 'Often' (3); and 'Everyday' or 'Almost every day' (4). A 'Don't know' (DK) response was also allowed. The FIS scores are computed by summing all of the item scores. Scores for each of the four domains can also be computed. The final score could vary from 0 to 56, for which a higher score denoted a greater degree of the impact of child's oral conditions on the functioning of parents-caregivers and the family as a whole.

In 2013 Thomson and cols developed the short form of the P-CPQ [67] obtaining a 16-and 8-item short-form versions of the P-CPQ and FIS-8 short forms that were developed using data from two New Zealand pre/post-test interventional studies. The internal reliability, validity and responsiveness of the short-form versions were acceptable. [68]

5.2.4. Child Oral Impacts on Daily Performances [69]

The C-OIDP index is specifically designed to show the final impact of a number of oral health related conditions which can affect child's daily life. it is a short and enjoyable questionnaire, and relatively quick to administer. The modification of the OIDP included adjusting the language, changing the sequence of questions, simplifying index scales and shortening the recall period. When the index had been validated, pictures of performances were developed and tested in order to make the interview more practical. It was developed and tested among 11–12 year old Thai children. Eight activities are considered: eating, speaking, cleaning teeth, relaxing, emotion, and smiling, studying, and social contact.

The 0–5 scale was changed into 0–3 scale on the computer, by grouping together scores of 1 and 2, and scores of 4 and 5.

The index score is based on the score for each of these eight daily activities. The score for each activity is obtained by multiplying the frequency value by the severity value; the maximum score is therefore 3x3=9. Thus, the score scale for each activity is between 0 and 9. The total score is calculated by adding the scores for all activities, divided by the maximum score possible (8x9=72) and multiplying by 100. The index score ranges therefore between 0-100.

The C-OIDP has two modes of the same questionnaire: bone is interviewer-administered and the other is self-administered, and the latter is used in this validation for adolescents. Both modes have been shown to produce similar results.

5.2.5. The Child Oral Health Impact Profile [70]

The COHIP consists of 34 questions grouped into five domains measuring: oral health, functional well-being, socio-emotional well-being, school performance and self-image. This instrument was designed to measure self-reported OHRQoL in children 8-15 years of age, using both positive and negative questions. It was created by an international study and was simultaneously validated in the U.S.A., Great Britain, Spain, Portugal, China, France and Holland in 2007. Data reported suggest that this instrument has an acceptable validity and reliability (Cronbach's alpha 0.91, 0.84 CCI) to be applied in population of 8 to 15 years.

	Questionnaire	Original Language	Abbreviation	year	Validated in other languages
Child Oral Health Quality of Life Questionnaire C0HQOL	Child Perception Questionnaire 11-14	English	CPQ_{11-14}	2005	Árabic, [73] Portugués [74], Chinese, [75] German [76], Italian, Cambodian [77], Danish [78]
	CPQ11-14 Short form	English		2006	Portuges, Arabic 79
	Child Perception Questionnaire 8-10	English	CPQ_{8-10}	2004	Spanish [80] Portugués, Danés, Bosnian
	Family Impact Scale	English	FIS	2007	Chinese, Portugués [81]
	Parental-Caregiver Perceptions Questionnaire	English	P-CPQ	2003	Chinese, Peruvian Spanish [82]
Child Oral Impacts of Daily Performance		English	Child-OIDP	2008	Spanish [83] Canarain Portugues, Swahilli, Malayan, French, Hebrew [84]
OIDP abreviated		English		2012	Indial [9] Albanian
Child Oral Health Impact Profile		English	COHIP[29]	2008	Spanish Persian [85] Corean [86]
Early Childhood Oral Health Impact Scale		English	ECOHIS[27]		Turkey [87], Persian [88] Chinese [89]. French [90] Lituan [91], Portugues [92]
Scale of Oral Health Outcomes		English	SOHO-5	2013	Portugues

Table 2. Questionnaires to asses OHRQoL in children

5.2.6. The Early Childhood Oral Health Impact Scale (ECOHIS) [71]

It was designed to evaluate OHRQoL of children of preschool age and younger. The ECOHIS consists of 13 questions relevant to preschool-age children. The survey questionnaire relies on parental ratings of the 13 items grouped in two main parts: the child impact section and the family impact section. The child impact section covers four domains: child symptoms (1 item), child functions (4 items), child psychology (2 items), and child self-image and social interaction (2 items). The family impact section covers two domains: parental distress (2 items) and family function (2 items). Each question asks about the frequency of an oral health-related problem and is scored on a scale from 0–5, as follows: never (score 0), hardly ever (score 1), occasionally (score 2), often (score 3), very often (score 4), don't know (score 5).

5.2.7. Scale of Oral Health Outcomes (SOHO) [72]

As dental caries is a chronic disease that can affect children from a very young age and it is important to measure its impacts on quality of life, as they may affect the psychological, social and educational development of the first self-reported OHRQoL measure among 5 year-old children. All inter-item correlations were positive and none was very high, and all item-total correlation coefficients were above the recommended level of 0.2

Cronbach's alpha was 0.74. Despite the positive initial results, the assessment of this questionnaire should be an on-going process, by extending psychometric testing to properties not evaluated so far, and assessing its applicability and performance in other populations.

6. Conclusions

Multiple definitions have been postulated to conceptualize HRQoL and OHRQoL and in spite of there are different concepts we can see in every single one that quality of life refers to something much broader than health than physical status, it promotes to see a human being and his environment.

Important to mention that the assessments in the area of health are usually performed by the "professional" and although this is deemed appropriate, they often do not reflect the complex set of feelings that patient has about having or not having good health and quality of life. Therefore, relevant information about the quality of life is of practical importance for various actors in the health sector such as the health policy makers, health services researchers, epidemiologists, health program evaluators, who should underpin and complement their decisions based on this information. The evaluation of these concepts should not substitute clinical ones; rather those should complement them so to take into account the patient's own perception of their health, expectations, desires and needs. In this sense it is accepted and recognized by dental community that oral health status can cause considerable pain and suffering, dentists should not be only focus on physical status but in subjective evaluations about how people feel and how much they are satisfied or affected with their own oral condition.

The evaluation of OHRQoL promotes a shift from traditional dental criteria assessment and care that focus on a person´s social and emotional experience and physical functioning in defining appropriate treatment goals and outcomes.

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