

Psychological aspects of orthognathic surgery and its effect on quality of life in Egyptian patients

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الجوانب السيكولوجية في جراحة تقويم الفكين وتأثيرها على نوعية حياة المرضى المصريين
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الخلاصة: شملت هذه الدراسة 120 مريضاً تتراوح أعمارهم بين 11 و33 عاماً، قاموا بإجراء أنواع عديدة من جراحة تقويم الفكين في مستشفيات القاهرة وذلك في ما بين عامي 1998 و2004. وقد أجاب المرضى على استبيان معياري للتعرف على دوافع المرضى لالتماس الجراحة، ومدى رضائهم عن النتيجة، وتأثير ذلك على نوعية الحياة. أما قبل الجراحة، فقد كانت الأسباب التحميلية غالباً هي الدافع الرئيسي لإجراء الجراحة لنحو 95% من المرضى. وأما بعد الجراحة، فقد كان رد فعل 85% من المرضى إيجابياً تجاه نتائج الجراحة، وتأثيرها على نوعية حياتهم. كما أن تحسّن النواحي التحميلية لوجوه المرضى بعد الجراحة يترافق غالباً بتحسّن في جودة حياتهم في شتى الجوانب التي تمت دراستها.

ABSTRACT A study was made of 120 patients aged 11–33 years who underwent various types of orthognathic surgery in a Cairo hospital between 1998 and 2004. Patients answered a standardized questionnaire to identify motives for seeking surgery, the degree of satisfaction with the outcome and its effect on quality of life. Preoperatively, aesthetic reasons were the primary motive for seeking surgery in 95% of patients. Postoperatively, 85% of the patients were positive about the outcome of surgery as well as its effect on their quality of life. Postoperative improvement of facial aesthetics of the patients was associated with improvement of their quality of life in all aspects tested.

Aspects psychologiques de la chirurgie orthognathique et son effet sur la qualité de vie de patients égyptiens

RÉSUMÉ Une étude a été menée auprès de 120 patients, âgés de 11 à 33 ans, ayant subi diverses formes de chirurgie orthognathique dans un hôpital du Caire entre 1998 et 2004. Ces patients ont répondu à un questionnaire standardisé visant à identifier les motifs de demande d'intervention chirurgicale, le degré de satisfaction quant au résultat de l'intervention et son influence sur la qualité de vie. Au stade préopératoire, les raisons esthétiques constituaient le motif principal de la demande d'intervention pour 95 % des patients. En postopératoire, 85 % des patients se déclaraient satisfaits du résultat de l'intervention et quant à son effet sur leur qualité de vie. L'amélioration postopératoire de l'esthétique faciale des patients est apparue associée à une amélioration de la qualité de vie pour tous les aspects considérés.

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Introduction

Orthognathic surgery refers to a group of corrective bone operations that involve movement of the jawbones completely or in parts [1]. Orthognathic surgery is indicated when there are severe dentofacial deformities that cannot be managed by orthodontic treatment alone, especially in adulthood, when the natural growth forces have ceased [2]. Dentofacial deformities are described as deformities that affect primarily the jaws and dentition. They may be limited to one jaw or may extend to multiple craniofacial structures [3].

The history of orthognathic surgery dates back to the 19th century, when Le Fort described the classic lines of maxillary fracture. Wassmund, in 1927, was the first surgeon to use an osteotomy line on Le Fort I level for the correction of malocclusion. Le Fort I osteotomy was popularized by Obwegeser in the mid-20th century as a standard procedure in maxillofacial surgery to correct dentofacial deformities [4,5]. The modern history of orthognathic surgery started in the 1970s, as it gradually became a routine choice, with benefits such as improvement of mastication and reduction of facial pain and more stable results even in severe discrepancies [6,7].

The prevalence of dentofacial deformities has been estimated as 20% of the population worldwide [8]. Data gathered from the United States of America points to a prevalence of approximately 20% of the US population, of which 2% warrant surgery [9]. In Scandinavia, it has been estimated that 10% of young people are in need of orthodontic treatment [10]. In the Netherlands, it has been found that 39% of the population needs orthodontic treatment [11]. Indications for orthognathic surgery, other than the purely anatomical ones, include the psychosocial and biophysiological

factors which greatly affect the need and demand for treatment. Desire for aesthetic improvement has been expressed as the major reason for seeking orthognathic surgery in several studies [12–18].

The motivations of orthognathic surgery candidates to seek treatment have been studied by Edgerton and Knorr [19], who described 2 types of motivations, external and internal. External motivations include the need to please others, “paranoid” ideas and beliefs that one’s career or social ambitions are being thwarted by physical appearance. These motivations require a change in the patients’ personal environment rather than surgery to solve the problem [12]. Internal motivation is usually a more valid form of motivation and includes long-standing inner feelings about deficiencies in one’s appearance. These individuals are better candidates for surgery [12,20].

Considering the psychological aspects, neuroticism may have a negative effect on the early postoperative phase but not on the long-term outcome [16]. Although patients with dysmorphophobia (feeling unattractive despite having almost normal appearance) may benefit from surgery, the initial treatment should be psychiatric rather than surgical [12]. Pogrel and Scott [21] concluded that most orthognathic surgery patients are psychologically normal, and routine preoperative psychological evaluation is not indicated. A cornerstone of a successful outcome is a thorough evaluation of the patient’s expectations and careful preoperative information about the surgical process.

Human biophysiology phenomena are similar throughout the world, but psychosocial responses may differ considerably between different cultures. Dentofacial deformities requiring orthognathic surgery involve both psychosocial and biological considerations. Although orthognathic

surgery has been widely practised in Egypt for some time, data about the psychological aspects of treatment are still lacking.

The aim of this study was to assess the motivation for surgery of a group of patients undergoing orthognathic surgery in a Cairo hospital, the degree of their satisfaction with the outcome of surgery and its effect on the quality of their lives.

Methods

Patients

A total of 120 patients (48 male and 72 female) with dentofacial deformities indicated for orthognathic surgery in the Department of Maxillofacial Surgery, Air Force General Hospital, Cairo, were studied between the years 1998 and 2004. The hospital treats Air Force personnel, including those in the active service and retired pensioners, as well as their dependents.

Preoperative assessment

A lateral cephalogram as well as frontal and lateral photographs with the lips at rest were taken for each patient. ANB angle was the parameter used as a representative of severity of class III malocclusion. ANB angle is the difference between SNA and SNB angles which demonstrates the sagittal discrepancy between the upper and the lower jaws in both class II division I and class III malocclusions. In class II division I, the severity of anteroposterior discrepancy is determined by ANB angle measurements greater than 2 degrees. In class I division II the ANB angle is less than 0 degrees. The more negative the ANB angle the more severe the skeletal discrepancy in the sagittal direction.

The type of surgery and its expected outcome were explained to each patient with the help of diagrams, photos and study models, and consent was obtained before

he or she was scheduled for operation. The patients were asked to answer the 1st part of a standard questionnaire to identify their symptoms and problems, their motives for seeking surgery and their expectations from it.

Postoperative assessment

After a period of 6 months to 1 year post-operatively, the patients were requested to answer the 2nd part of the questionnaire to assess the postsurgical outcome and the degree of the patient's satisfaction with the results as well as its effect on her/his quality of life. Visual analogue scales based on the method documented by Philips et al. [22] were used to measure the patient's satisfaction with the result. All patients gave a clear written consent for participation.

Questionnaires and measurements

The 2 parts of the questionnaire were developed by the authors with reference to other investigators [14,17,22–26]. The questionnaire included both qualitative and quantitative data by multiple-choice answers on a numerical scale ranked from 0 to 4 [0 not at all, 1 a little, 2 moderately (good), 3 markedly (very good), and 4 extremely (excellent)]. The quality of life was assessed using the Derriford Appearance Scale (DAS59) [24,25], adjusted for individuals below the age of 16 years and a reading level of the 6th grade of general education. Only 3 factorial subscales were used in this study: general self-consciousness of appearance, social self-consciousness of appearance and negative self-concept.

The questionnaires were translated into Arabic separately by 2 translators. The 2 versions were combined and revised and then back translated into English by a 3rd translator. The translation was refined after back translation until agreement was obtained among the 3 translators. A group of 4

bilingual experts (Arabic speaking) including a clinical psychologist examined the 2 versions of the questionnaire for content and construct validity and agreed upon it. The marking of the scale was examined and the weighting of the scores discussed.

The translation was then piloted for comprehension and ease of administration on 13 patients (7 males and 6 females) not participating in this study. Minor adjustments were made to the questionnaire to improve clarity but no major changes were judged necessary.

Statistical analysis

A statistical analysis system (*SAS*, version 7) was used. The tests used were *t*-test for differences and the Pearson correlation coefficient (*r*).

Results

The age and sex distribution of the patients are summarized in Table 1. The age range was 11–33 years; mean age 21.0 years [standard deviation (SD) = 4.1].

Initial diagnoses

The clinical diagnosis of the patients is shown in Table 2. Anteroposterior discrep-

Table 1 Age and sex distribution of the study group

Age (years)	Male No.	Female No.	Total No.
11–15	1	0	1
16–20	30	40	70
21–25	15	27	42
26–30	1	4	5
31–35	1	1	2
Total	48	72	120

Table 2 Clinical diagnosis of the study group

Clinical diagnosis	No. of patients	%
Class II division 1 malocclusion	44	36.7
Class III malocclusion	17	14.2
Retrognathia	21	17.5
Anterior open bite	36	30.0
Mandibular asymmetry	2	1.7
Total	120	100.0

ancies constituted 69.4% of the dentofacial deformities, open bite 30.0%, and mandibular asymmetry 1.7%. Class II division 1 malocclusion constituted 36.7% of the cases with a mean ANB angle of 7.0 (SD 0.74) degrees (Table 3). Class III malocclusion constituted 14.2% of the cases with a mean ANB angle of –7.0 (SD 2.5) degrees.

Operations performed and outcomes of surgery

Table 3 shows a comparison between the measurements of ANB angle before and after surgery. A mean difference of 3.6 degrees (SD 0.54) in ANB angle measurements were achieved postoperatively in class II division I, and 8.3 (SD 1.0) degrees in class III cases. The difference between the pre- and postoperative ANB angle measurement in class II division I cases were statistically significant ($t = 32.7$; $P < 0.01$) as well as in class III cases ($t = 24.4$; $P < 0.01$).

Motives for treatment

The motives for seeking treatment among the study group are listed in Table 4. In 114 patients (95%) improvement of facial aesthetics was the primary reason for seeking treatment, and most of them were free

Table 3 Comparison between preoperative and postoperative ANB angle measurements in patients with class II division I and class III malocclusion

Type of malocclusion	ANB angle measurements (degrees)			
	Preoperative		Postoperative	
Class II division 1 (n = 44)				
Minimum	5		1	
Maximum	14		4	
Mean (SD)	7.0	(0.74)	2.4	(0.6)
Class III (n = 17)				
Minimum	-5		0	
Maximum	-21		2	
Mean (SD)*	-7.0	(2.5)	1.0	(0.94)

SD = standard deviation.

from symptoms or functional problems. The remaining 6 patients (5%) cited functional problems and speech defects in addition to aesthetic reasons for seeking treatment. Some of the patients with the anterior open bite deformity cited their functional problems as secondary to their aesthetic problems.

Table 4 Primary motives for seeking treatment among the study group

Motives for seeking treatment	No. of patients	%
Aesthetic motives		
Improvement in facial appearance	114	95.0
Functional motives		
Improvement of temporomandibular joint problem	0	0
Improvement in chewing ability	2	1.7
Improvement in speaking ability	4	3.3
Improvement in breathing	0	0
Total	120	100.0

Modified from Ostler and Kiyak [20].

Satisfaction with outcome

Out of the 120 patients who underwent orthognathic surgery in this study, 101 patients (84.2%) were satisfied with the outcome of surgery (Table 5). The degree of satisfaction of the patients with the postoperative results varied between very good (score 3) (16 patients) and excellent (score 4) (85 patients). The mean group score was 3.4 (SD 0.6).

Correlation analysis was made using the coefficient of correlation (r) (Pearson) in order to detect the relationship between the outcome of surgery and the degree of the

Table 5 Postoperative degree of satisfaction with the outcome of surgery among the study group

Degree of satisfaction	No. of patients	%
Not at all	9	7.5
A little	0	0
Moderate	0	0
Very good	26	21.7
Excellent	85	70.8
Total	120	100.0

patients' postoperative satisfaction with the results. A strong positive correlation existed between the patients' satisfaction scores and the preoperative measurements of ANB angle in patients with class II division 1 malocclusion ($r = 1.0$, $P < 0.01$). A strong negative correlation was found between the patients' postoperative satisfaction and the preoperative measurements of ANB angle ($r = -1.0$, $P < 0.01$). Sex differences were not significant in either post-surgical satisfaction or self-reported pain.

Quality of life

The quality of life questionnaire revealed that 101 patients (84.2%) reported positive changes in the quality of their lives after surgery. The percentage of change in the DAS59 factorial subscale scores was 70% improvement for the general self-consciousness of appearance, 58% for the social self-consciousness of appearance, and 43% for the negative self-concept. There was also a significant difference between the preoperative and postoperative mean group scores of the DAS59 factorial sub-scales tested in this study (Table 6).

Discussion

Many previous studies on the psychological profiles of the orthognathic surgery

patients have been retrospective and/or based on recollection of patients' preoperative expectations only after the surgery has been performed [15,17–28], in addition to problems due to drop-out of patients during follow-up. Although in some studies patients were assessed before and after surgery, rarely have standardized questionnaires been used [17,21]. No similar studies from Egypt or from other parts of the Eastern Mediterranean Region are available for comparison. Until replicated, this study will stand alone.

In this study, the limitations of previous studies (small patient sample, retrospective study and high drop-out rate) were avoided as far as possible by using a prospective study design, a study sample of 120 patients with a mean follow-up of 4 years. Since this study was performed in a military hospital, it was easy to recall the patients regularly for postoperative check-up, and hence, no drop-out of patients was reported. Standardized questionnaires were meticulously translated into Arabic to achieve precision of data and the numerical scale ranked answers facilitated the comparison.

In this study, the patients' demand for orthognathic surgery seemed to be largely driven by desire to improve their appearance. Previous studies have revealed that patients' motives for seeking treatment

Table 6 Preoperative and postoperative mean scores on the Derriford Appearance Scale (DAS59) factorial sub-scales for the study group (n = 120 patients)

Diagnosis	Preoperative		Postoperative		% change	t-value ^a
	Mean score	SD	Mean score	SD		
General self-consciousness of appearance	48.2	(13.6)	14.2	(11.9)	-70	t = 12.2
Social self-consciousness of appearance	29.5	(15.6)	12.3	(10.9)	-58	t = 5.4
Negative self-concept	17.2	(4.1)	9.7	(3.5)	-43	t = 9.0

^aP < 0.0001.

were primarily related to appearance/self image rather than functional issues [12–18]. In some studies up to 89% of patients were reported to have aesthetic motives for seeking treatment [17,22]. However, in a study by Frost and Peterson the number of patients with aesthetic motives was as low as 4% [28]. In 2 studies from Sweden [29,30], aesthetic motives for seeking treatment were found to be slightly less important than functional motives. In a study from Denmark [31], functional reasons were cited more often than aesthetic reasons. However in a study by Ostler and Kiyak [20], self-concept problems were found to be as equally serious as functional problems. The motives for improving aesthetics in this study varied among individuals. In some patients, the motive was the improvement of physical attractiveness, regardless of the severity of the deformity. Some others felt aesthetically impaired to the degree of having a social handicap. Improvement of facial aesthetics after surgery was associated with improvement of social acceptance. Still others were the victims of ridicule, as in an 11-year-old boy, who was given by his schoolmates the nickname “Boogy”, a cartoon character on Egyptian TV. The child felt embarrassed to the degree that he refused to go school. The surgery had a positive influence on the relationships with his schoolmates. Interestingly in this study, some patients reported postoperative improvement of facial aesthetics more than they reported such improvement as their motive for seeking treatment. Frost and Peterson [28] also reported satisfaction with the postsurgical aesthetic changes of their patients although they listed functional problems as patients’ motivation for seeking treatment. Another interesting finding in this study was that some patients reported postoperative improvement of function although they did not mention functional

complaints among their motives for seeking treatment. Such patients probably had pre-surgery trouble sustaining social problems which they considered more important than functional problems.

In this study 85% of the patients reported improvement of their facial appearance and satisfaction with the postoperative aesthetic changes. This was unlikely to be achieved unless the defects were actually corrected. The degree of patient’s satisfaction with the outcome of surgery seems to be associated with the severity of their deformities, since 50% of the patients in this study had class II division I or class III skeletal deformities. This is in agreement with previous studies which suggest that class I skeletal patterns are perceived to be more attractive than class II and class III patterns [27]. Furthermore, measures of anteroposterior dental discrepancy, especially incisal overjet, seem to be related to the perception of facial attractiveness since the subjects having the greater anteroposterior discrepancy are more likely to be considered less attractive [24]. Self-perception of profile was important in the patients’ decision to seek surgery in the present study. In this study, an improvement of facial aesthetics was seen after orthognathic surgery as the measure of anteroposterior discrepancy decreased, in agreement with earlier reports [27–31].

The Derriford Scale (DAS59) selected for use in this study is a condition-specific measure that assesses appearance-related quality of life. According to the results of this questionnaire a majority of patients had positive changes in all aspects of quality of life after surgery. They showed a rise in morale, self-contentment, and self-esteem and change in lifestyle as a result of surgery, as in 2 patients who stated that they looked younger after surgery. These findings sup-

port the impression that patients seeking orthognathic surgery are psychologically stable. On the whole, the patients in this study seemed to have had realistic expectations. This was evident in the high degree of correlation between the aim of the surgery and the outcome that led to the satisfaction with the treatment.

In this study, focusing on the surgical phase of orthognathic surgery, only group findings have been reported, and many clinical and cephalometric factors need to be considered in the future when planning treatment for each individual patient. It may be, for instance, reasonable to provide some form of attempted growth-modification treatment for those patients for whom there is doubt about the ultimate choice of the treatment method. Orthodontic treatment that followed orthognathic surgery for some patients in this study was not included in this report.

Little has been written about the costs of orthognathic surgery compared with other health services in all fields. Dolan and White [32] found that the time spent in

hospital following orthognathic surgery had decreased significantly over a few years. They concluded that this was due to the use of internal rigid fixation method, which, on the other hand increases the expenses of orthognathic surgery. However, there seem to be no comprehensive reports on the costs and cost factors of the whole process of orthognathic surgery.

Conclusions

Aesthetic reasons were the primary motive for seeking orthognathic surgery regardless of age or sex.

The degree of patients' postoperative satisfaction with the outcome of the surgery correlated with the severity of their preoperative dentofacial deformities.

The postoperative improvement of facial aesthetics of the patients was associated with a similar improvement in the quality of their lives in all the aspects tested in this study.

References

1. Wolford L M, Fields RT. Surgical planning. In: Booth PW, Schendel SA, Hausamen JE, eds. Maxillofacial surgery. London, Churchill Livingstone, 1999:1205-57.
2. Proffit WR, White RP Jr. Who needs surgical orthodontic treatment? International journal of adult orthodontics and orthognathic surgery, 1990, 5:81-9.
3. Ong MAD. Spectrum of dentofacial deformities. Annals of the Academy of Medicine, Singapore, 2004, 33:239-42.
4. Steinhauser EM. Historical development of orthognathic surgery. Journal of cranio-maxillo-facial surgery, 1996, 24:195-204.
5. Drommer RB. The history of "Le Fort I osteotomy". Journal of maxillofacial surgery, 1986, 14:119-22.
6. The need for surgical orthodontic treatment. In: Proffit WR, White RP Jr, eds. Surgical orthodontic treatment. Mosby, St Louis, 1991:2-23.
7. Proffit WR, Turvey TA, Phillips C. Orthognathic surgery: a hierarchy of stability. International journal of adult orthodontics and orthognathic surgery, 1996, 11:191-204.
8. Woldorf LM, Fields RT. Surgical planning. In: Booth PW, Schendel SA, Hausamen

- JE, eds. Maxillofacial surgery. London, Churchill Livingstone, 1999:849–61.
9. Proffit WR et al. Prevalence of malocclusion and orthodontic treatment in the United States: estimates from the NHANES III survey. *International journal of adult orthodontics and orthognathic surgery*, 1989, 13:97–106.
 10. Permert L, Karlander EL, Wilhelm E. Treatment of malocclusions in children and adolescents at a public dental service clinic in Sweden: extent and cost. *Swedish dental journal*, 22:187–193.
 11. Burgersdij R et al. Malocclusion and orthodontic treatment needs of 15–74-year-old Dutch adults. *Community dentistry and oral epidemiology*, 1991, 19:64–7.
 12. Cunningham SJ, Hunt NP, Feinmann C. Psychological aspects of orthognathic surgery: a review of the literature. *International journal of adult orthodontics and orthognathic surgery*, 195, 10:159–72.
 13. Peppersack WJ, Chausse JM. Long term follow-up of the sagittal splitting technique for correction of mandibular prognathism. *Journal of maxillofacial surgery*, 1978, 6:117–40.
 14. Jacobson A. Psychological aspects of dentofacial aesthetics and orthognathic surgery. *Angle orthodontist*, 1984, 54:18–35.
 15. Flanary CM, Barnwell GM Jr, Alexander JM. Patient perceptions of orthognathic surgery. *American journal of orthodontics*, 1985, 88:137–45.
 16. Kiyak HA, Bell R. Psychological considerations in surgery and orthodontics In: Proffit WR, White RP Jr, eds. *Surgical-orthodontic treatment*. St Louis, Mosby Year Book 1991:71–91.
 17. Finlay PM, Atkinson JM, Moos KF. Orthognathic surgery: patient expectations, psychological profile and satisfaction with the outcome. *British journal of oral and maxillofacial surgery*, 1995, 33:9–14.
 18. Rodrigues-Garcia RCM et al. Effects of major class II occlusal correction on temporomandibular signs and symptoms. *Journal of orofacial pain*, 1998, 12:185–92.
 19. Edgerton MT, Knorr MJ. Motivational patterns of patients seeking cosmetic (aesthetic) surgery. *Plastic and reconstructive surgery*, 1971, 48:551–57.
 20. Ostler, Kiyak HA. Treatment expectations versus outcomes among orthognathic surgery patients. *International journal of adult orthodontics and orthognathic surgery*, 1991, 6:247–55.
 21. Pogrel MA, Scott P. Is it possible to identify the psychologically “bad-risk” orthognathic surgery patient preoperatively? *International journal of adult orthodontics and orthognathic surgery*, 1994, 9:105–110.
 22. Philips C, Tulloch C, Dann C. Rating of facial attractiveness. *Community dentistry and oral epidemiology*, 1992, 20:214–20.
 23. Alsarraf R. Outcomes instruments in facial plastic surgery. *Facial plastic surgery*, 2002, 18 (2):77–86.
 24. Ching S et al. Measuring outcomes in aesthetic surgery: a comprehensive review of literature. *Plastic and reconstructive surgery*, 2003, 111(1):469–80.
 25. Carr T, Harris D, James C. The Derriford Appearance Scale (DAS59): a new scale to measure individual responses to living with problems of appearance. *British journal of health psychology*, 2000, 5:201–7.
 26. Harris DL, Carr AT. The Derriford Appearance Scale (DAS59): a new psychometric scale for the evaluation of patients with disfigurement and aesthetic problems of appearance. *British journal of plastics*, 2001, 54:216–22.
 27. Heldt L, Haffke EA, Davis LF. The psychological and social aspects of orthognathic treatment. *American journal of orthodontics*, 1982, 82:318–28.

28. Frost V, Peterson G. Psychological aspects of orthognathic surgery. How people respond to facial change. Oral surgery, oral medicine, and oral pathology, 1991, 71:538-42.
29. Garvill J et al. Psychological factors in orthognathic surgery. Journal of cranio-maxillo-facial surgery, 1992, 20:28-33.
30. Ek E, Persson J, Lundgren S. Surgical correction of dentofacial anomalies: an evaluation of two patient groups with the aid of a questionnaire. Swedish dental journal, 1997, 21:101-10.
31. Athanasiou AE, Melsen B, Eriksen J. Concerns, motivations, and experience of orthognathic surgery patients: a retrospective study of 152 patients. International journal of adult orthodontics and orthognathic surgery, 1989, 4:47-55.
32. Dolan P, White RP. Community hospital charges for orthognathic surgery. International journal of adult orthodontics and orthognathic surgery, 1996, 11:253-55.

World oral health report 2003

Chronic diseases and injuries are the leading health problems in all but a few parts of the world. The rapidly changing disease patterns throughout the world are particularly linked to changing lifestyles which include diets rich in sugar, wide-spread use of tobacco and increased consumption of alcohol.

Traditional treatment of oral diseases is extremely costly in several industrialized countries and not feasible or possible to most low-income and middle-income countries. The WHO Global Strategy for prevention and control of noncommunicable diseases and the common risk factor approach is a new strategy to managing prevention and control of oral diseases. The World oral health report 2003 outlines the current oral health situation at global level and the strategies and approaches for better oral health in the 21st Century.

Petersen PE. World oral health report 2003 Continuous improvement of oral health in the 21st century - the approach of the WHO Global Oral Health Programme. Geneva, WHO, 2003 (WHO/NMH/NPH/ORH/03.2)

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