INTEGRATIVE JOURNAL OF MEDICAL SCIENCES

MIDITERRANEAN JOURNALS

2021, Volume 8, ID 465
Research Article
DOI: 10.15342/ijms.2021.465

Beumer Classification of Labial-alveolar-palatal Clefts: Suggestion for Complement

Wijdane El Hawari, Abdoulmajid Habibou, Nadia Merzouk , Oussama Bentahar

Department of Prosthodontics, Faculty of Dental Medicine, University Mohammed V, Rabat, Morocco.

ABSTRACT

Orofacial clefts are a common birth defect characterized by the involvement of the nasal and oral structures. Several classifications of orofacial clefts have been proposed with the aim of generalizing rational criteria allowing communication and exchange between the different practitioners. Among these classifications, the classification of Beumer has got surgical and prosthodontic interests (making an orthopedic plate).

The authors propose to update this classification by modifying it and proposing a class that did not exist in the original classification. This modification seems important to us as a complement to this classification.

Keywords: Orofacial Clefts, Beumer Classification, Surgical Intervention, Orthopedic Plate.

Received: 23 Feb 2021; **Revised:** 01 July 2021; **Accepted:** 03 July 2021; **Published:** 19 Aug 2021

Correspondence: Wijdane El Hawari, Department of Prosthodontics, Faculty of Dental Medicine, University Mohammed V, Avenue Allal Al Fassi, Rue Mohammed Jazoulit, Madinat Al Irfane, BP: 6212, Rabat. Email: wijdane.elhawari@um5s.net.ma

Cite this article as: El Hawari W, Habibou A, Merzouk N, Bentahar O. Beumer classification of labial-alveolar-palatal clefts: Suggestion for complement. Integr J Med Sci. 2021;8:465. [https://doi.org/10.15342/ijms.2021.465].

INTRODUCTION

Orofacial clefts are a common birth defect characterized by involvement of the nasal and oral structures [1]. They are distinguished by a polymorphism that necessarily imposes a standardization by a classification [2]. The management should be multidisciplinary and including several specialties.

Different recommendations were made regarding the establishment and formulation of classifications. The nomenclature committee of the American Cleft Palate Rehabilitation Association has published criteria for an ideal classification and mainly concern certain parameters: Definitions should be concise and clear, a logical distribution with the economy of expression and promotion of academic and clinical research by standardized procedures [3].

Indeed, a simple and comprehensive classification is better accepted scientifically [4]; it must be clearly defined and based on embryological criteria [5] and must allow the establishment of communication, the development of a treatment plan and the comparison of results between the different centers [6].

Since 1922, several classifications of orofacial clefts have been proposed with the aim of generalizing rational criteria allowing communication and exchange between the various practitioners. [4]. The most accepted classification is the Kernahan and Stark's classification 1958 and who used the incisor foramen as a separating elements between the anterior and posterior structures. [1] [7] [8], in 1971 Kernahan modified it by introducing the concepts of protrusion of the maxilla and the velopharyngeal competence. The

classification of the American Association of cleft palate (ACPA) is considered probably among the best today [8].

The majority of the proposed classification systems are based on the morphology of the cleft rather than embryological bases [8], and no classification is universally adopted nowadays [2].

In 2011, John Beumer published the third edition of his book entitled "Prosthodontic and surgical management of cancer related, acquired, and congenital defects of the head and neck" and introduced a new classification which we believe is extremely useful in the field of maxillofacial prosthodontic rehabilitation [12]. We propose through this work an updating of this classification by suggesting a complement.

EMBRYOLOGICAL REMINDER

The facial clefts of the primary palate appear before those of the secondary palate, they have a distinct origin even they are often associated. At the 5th week of the intrauterine period, the formation of the stomodeum or primary oral cavity is accomplished. This cavity is surrounded by 5 facial buds: the frontal bud, two maxillary buds, and two mandibular buds. The frontal bud will be the site of formation of the external and internal nasal buds which will later constitute the nasal cavities. The maxillary buds will in turn merge to merge with the nasal buds and form the upper lip and primary palate.

A coalescence defect at this level will result from unilateral or bilateral labial and/or labioalveolar clefts [10].

During the 6th week of the intrauterine period, the primitive tongue occupies the whole of the stomodeum, but during the 7th week this will subside and the palatal processes which initially developed in the vertical direction will join together in a horizontal direction to unite with the nasal septum in the middle and anteriorly with the primary palate. This union in the shape of "Y" will separate the oral cavity from the nasal cavity.

The point of convergence of the three arms of this `` Y '' constitutes the anterior palatine canal which marks the limit between the primary and secondary palate, therefore a defect of coalescence at the level of the secondary palate can be either unilateral (characterized by communication bucconasal deviated from the affected side) or bilateral [11].

BEUMER CLASSIFICATION AND PROPOSITION OF MODIFICATION

Beumer opted for a simple classification based on embryology which seems the most suitable for the practice of maxillofacial prosthodontics (in particular for orthopedic plates). In fact, three main categories have been described: Cleft lip and alveolar (primary palate), cleft of the hard and soft palate (secondary palate) and a combination of these two types (primary and secondary palate).

The clefts can be bilateral or unilateral, Beumer presented eight combinations: a- Normal lip and palate. b- Cleft uvula. c- Unilateral cleft of the posterior or secondary palate, d-Bilateral cleft of the secondary palate. e- Complete unilateral cleft of the lip and alveolar process with a unilateral cleft of the primary palate. f- Complete bilateral cleft of the lip and alveolar process with a bilateral cleft of the primary palate. g- Complete bilateral cleft of the lip and alveolar process with a bilateral cleft of the primary palate and unilateral cleft of the secondary palate. h- Complete bilateral cleft of the lip and alveolar process with a complete bilateral cleft of the primary and secondary palates [12],

If we want to situate the classification of Beumer among other classifications considered probably the best today (The American cleft palate association: ACPA, and the classification of Kernahan and stark);[8]

Kernahan and Stark (1991) proposed three groups, basing their classification on the location of the cleft in relation to the incisor foramen; thus they distributed it as follows: Clefts of anterior structures to the incisal foramen, Clefts of posterior structures to the incisal foramen, Clefts affecting the structures anterior and posterior to the incisal foramen

The classification of the American Cleft Palate-Craniofacial Association (ACPA): 1960 introduced a new term: the "prepalate" which includes both the lip and the alveolar process, they distinguished prepalate clefts (cleft of the lip and primary palate), Cleft palate (embryologic secondary cleft palate), cleft of prepalate and palate and finally Facial clefts other than the clefts of the prepalate and palate [7]

The present modification of Beumer classification introduced the unilateral and bilateral palatal division, which has an impact on both prosthodontic and surgical management but did not take into account the case of unilateral division of the lip and premaxilla associated with a palatal division (unilateral and bilateral): Class I (Figure 1)

The authors, therefore, propose to update this classification by modifying it and adding class I that did not exist in the original classification. It seems important to us to insert this complement into that proposal.

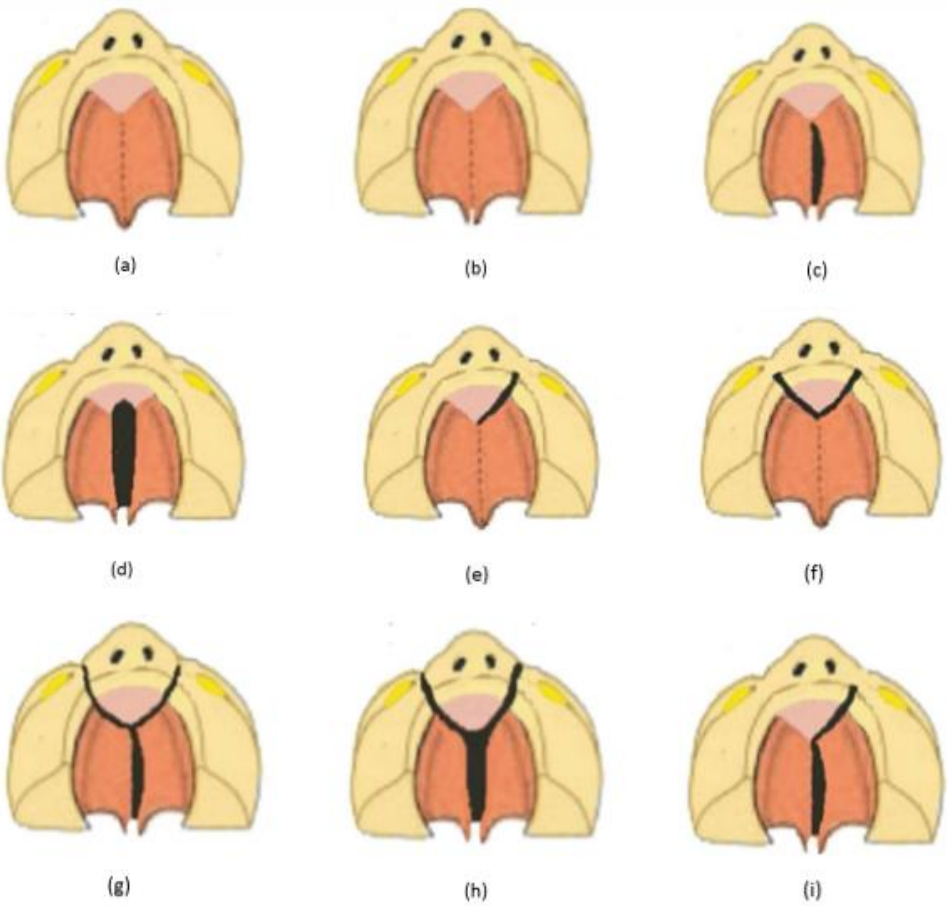

Figure 1: Schematic representation of the modified Beumer classification. (a) Normal lip and palate. (b) Cleft uvula. (c) Unilateral cleft of the posterior or secondary palate. (d) Bilateral cleft of the secondary palate. (e) Complete unilateral cleft of the lip and alveolar process with a unilateral cleft of the primary palate. (f) Complete bilateral cleft of the lip and alveolar process with a bilateral cleft of the primary palate. (g) Complete bilateral cleft of the lip and alveolar process with a bilateral cleft of the primary palate and unilateral cleft of the secondary palate. (h) Complete bilateral cleft of the lip and alveolar process with a complete bilateral cleft of the primary and secondary palates. (i) Unilateral lip and lip division associated with the unilateral palatal division of the premaxilla and premaxillary palate, associated with a divided palate.

CONCLUSION

The present proposal of this modification would fill a small lack or even omission of a very interesting classification on the surgical and prosthodontics plan. The communication among the centers and the establishment of a consensus in this regard remains the keystone for a rational management of these patients.

HIGHLIGHTS

Orofacial clefts are distinguished by a polymorphism which necessarily imposes a standardization by a classification.

The classifications considered probably the best these days are that of the American cleft palate association: ACPA, and the classification of Kernahan and stark.

Kernahan and Stark (1991) proposed three groups, basing their classification on the location of the cleft relative to the incisor foramen.

The classification of the American Cleft Palate-Craniofacial Association (ACPA): 1960 introduced a new term: the "prepalate" which includes both the lip and the alveolar process.

The present modified Beumer classification introduced unilateral and bilateral palatal division, which has an impact on both prosthodontic and surgical management.

Acknowledgments
None.

Authors' contributions
The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors. Indeed, all the authors have actively participated in the redaction, the revision of the manuscript, and provided approval for this final revised version.

Funding
No funding was received from any organization to conduct the present study.

Conflict of interest
The authors declare that there is no conflict of interest regarding the publication of this article.

Ethical approval
Although this is not a direct human study, no patient identifying data were used in the present study, but still, the authors declare that all the ethical principles were obeyed while designing and conducting the present study. In the time this study was designed and conducted our institution did not had any research or ethics committee, but the protocol for the present study was officially approved by the institutional academic council (Reference no: 181-3/9/2016).

REFERENCES

[1] Barbosa GL, Emodi O, Pretti H, Van Aalst JA, de Almeida SM, Tyndall DA, et al. GAND classification and volumetric assessment of unilateral cleft lip and palate malformations using cone beam computed tomography. Int J Oral Maxillofac Surg. 2016 Nov; 45(11): 1333-1340. Doi: 10.1016/j.ijom.2016.05.008

[2] Elsherbiny A, Mazeed AS. Comprehensive and reliable classification system for primary diagnosis of cleft lip and palate. J CranioMaxillofac Surg. 2017 Jun ; 45(6): 1010-1017. Doi: 10.1016/j.jcms.2017.03.008

[3] Harkins CS, Berlin A, Harding RL, Longacre JJ, Snodgrasse RM. A Classification of Cleft Lip and Cleft Palate. Plast Reconstr Surg Transplantat Bull. 1962 Jan; 29:31-9. Doi: 10.1097/00006534-196201000-00005

[4] Rodrigues R, Fernandes MH, Monteiro AB, Furfuro R, Sequeira T, Sequeira T, et al. SPINA classification of cleft lip and palate: A suggestion for a complement. Arch Pediatr. 2018 Oct; 25(7): 439-441. Doi: 10.1016/j.arcped.2018.08.001

[5] Sandham A. Classification of clefting deformity. Early Hum Dev. 1985 Oct; 12(1): 81-5. Doi: 10.1016/0378-3782(85)90140-9

[6] Naran S, Kirschner RE, Schuster L, Basri O, Ford M, Goldstein J, Et al. Simonart's Band: Its Effect on Cleft Classification and Recommendations for Standardized Nomenclature. Cleft Palate Craniofac J. 2017 Nov; 54 (6):726-733. Doi: https://doi.org/10.1597/15-319

[7] Allori AC, Mulliken JB, Meara JG, Shusterman S, Marcus JR. Classification of Cleft Lip / Palate: Then and Now. Cleft Palate Craniofac J. 2017 Mar; 54(2):175-188. Doi: 10.1597/14-080

[8] Singh D, Bastian TS, Kudva S, Singh MK, Sharma P. Classification Systems for Orofacial Clefts. Oral Maxillofac Pathol J. Jan-Jun 2015; 6(1): 556-560. [Accessed 2021 Aug 17]. Available from: https://www.ompj.org/files/c01b66a4126928dd63231a1ad32fadb4-6.pdf

[9] Ortiz-Posadas MR, Vega-Alvarado L, Maya-Behar J. A New Approach to Classify Cleft Lip and Palate. Cleft Palate Craniofac J. 2001 Nov; 38(6):545-50. Doi: 10.1597/1545-1569_2001_038_0545_anatcc_2.0.co_2

[10] E. Masson. [Embryonic development of the face]. 1990.

[11] Bender PL. Genetics of Cleft Lip and Palate. J Pediatr Nurs. 2000 Aug; 15(4):242-9. Doi: 10.1053/jpdn.2000.8148

[12] Beumer J, Marunick MT, Esposito S. Maxillofacial Rehabilitation: Prosthodontic and Surgical Management of Cancer-Related, Acquired, and Congenital Defects of the

Head and Neck. 3rd Revised edition. Hanover Park, IL: Quintessence Publishing Co Inc., US, 2011.