

Use of collaborative learning as a tool to evaluate syndromic craniofacial anomalies

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ABSTRACT

Almost 30% of oral clefts are associated with other structural abnormalities. However, little is known on orofacial characteristics related to these cases since they are not systematically reported. To close this gap, we developed a collaborative learning approach supported by an interprofessional team aiming to systematically describe oral findings and impact the training of future professionals that hopefully will incorporate these descriptions into their clinical practice. The methodological proposal consisted of small group sessions focusing on a particular syndrome or group of syndromes followed by examining patients with those conditions. Twenty cases were examined and studied over one semester and a set of conditions to be identified in the orofacial region was defined. Here, we present a guideline that we suggest that dentists and dental institutions use. We also present the advantages of using collaborative learning as a tool in the training of the clinician.

Descriptors: Cleft Palate. Education, Dental. Interdisciplinary Placement.

1 INTRODUCTION

The health care system relies on doctors, nurses, dentists and other health professionals (e.g. occupational therapists, social workers) to function. Beyond this reality, a range of non-clinical services provides the infrastructure necessary for the system to function, including spaces for learning^{1,2}.

Hospitals provide a rich learning environment for students, staff, patients, their families and caregivers, and converting the health care system into a learning organization is a key strategy to improve patient flow and consequently health outcomes, but also a challenge to understand how to maintain quality of the learning experience within the busy clinical environment in a daily basis^{2,3,4}. To address these needs, team members have to understand their roles and responsibilities related to their professions and to the collective team⁵, and see collaborative learning and teamwork as core competencies that impact the quality of health care provided⁶. Collaborative learning may be a useful lens to consider when defining how to enact this in practice. This type of learning may also assist in understanding how interprofessional education may encourage learners to work together by examining problems while interacting with peers to discuss and debate concepts, which will promote higher order cognitive reasoning^{6,7}.

In need to attract a highly competent workforce, hospitals are becoming aware of the unique opportunity in affiliating with universities and gathering their increasingly complex clinical context to this innovative educational tools^{4,8}. For that matter, the study of craniofacial anomalies is suitable to collaborative learning.

One gap that exists is that craniofacial abnormalities are not fully described in regard to orofacial alterations^{9,10}. This may be preventing a more in depth understanding of these

conditions and to address this concern, we developed a collaborative learning strategy to enhance the study and description of orofacial findings in individuals with syndromic forms of craniofacial anomalies.

This article describes our collaborative learning approach supported by an interprofessional team and proposes that it could be implemented in the dental clinical training of future professionals.

2 METHODS

The study was approved by the Ethics Committee of the Health Sciences Center, Federal University of Paraíba, opinion no. 3.445.829, CAAE 13450819.6.0000.5183. All patients signed an authorization term for the use of images. The study was designed to elaborate a collaborative learning process including dentists and physicians. The group was tasked to define genotype-phenotype correlations and clinical and pathological characteristics of a series of cases with syndromic craniofacial anomalies. The methodological proposal consisted of focus group discussions after self-learning and careful examination of oral and craniofacial features to create comprehensive records of orofacial findings, which are not typically (or are poorly) described in the literature. A total of 13 individuals (six clinical faculty and seven dental students/graduate students) comprised the group, with two faculty connecting virtually.

The process consisted of assigning each student with a self-study topic followed by a presentation to the rest of the group. Those topics matched the patients scheduled for examination. The study guide included a definition of the condition, its etiopathogenesis, clinical features, epidemiology, and genetic inheritance, as well as the typical dental treatment needs for each disease.

After the didactic presentations, patients

diagnosed with the previously studied conditions were evaluated clinically. We evaluated 20 patients with oral clefts that were diagnosed with Van der Woude Syndrome (9), Pierre Robin Sequence (5), Marfan Syndrome (2), Goldenhar Syndrome (2), Treacher Collins Syndrome (1) and Edwards Syndrome (1). They were submitted to anamnesis, physical examination (extraoral and intraoral clinical examination) with information and images collected focusing on intra-oral and facial findings, which are not typically described in detail in these craniofacial conditions.

3 RESULTS

General

We confirmed that the conditions we studied are bring very little detail on dental, oral, and facial findings. We studied nine syndromes during the semester, emphasizing general characteristics, epidemiology, etiology, clinical features, orofacial features, possible new orofacial findings, and treatment.

The main outcome of this process was a progressive elaboration of a checklist of dysmorphic and clinical findings (figure 1). This record included evaluation of feet, eyes, hands, ears, lips and facial dysmorphology. On intraoral examination, we considered types of clefts, mucosal pits, malocclusions, mandibular position, dental and enamel defects, palatal dysmorphology, tongue alterations and malpositions, temporomandibular disorders and dental care needs. Speech impairments, pharyngeal and larynx dysfunctions were also considered. We took extraoral and intraoral pictures from every patient for posterior evaluation.

The second outcome was the progressive elaboration of a clinical guideline with main features of each syndrome associated with cleft

lip palate and focusing on orofacial features discovered on examined patients (figure 2).

Van der Woude Syndrome Model

As an example to illustrate the collaborative learning process we are suggesting, we describe the evaluation of the cases of patients diagnosed with Van der Woude syndrome (VWS; Online Mendelian Inheritance in Man 119300). This syndrome is characterized by labial pits, cleft with or without cleft palate, hypodontia, and the syndrome may be also associated with ankyloglossia and cutaneous syndactyly of the toes¹¹. In addition, the mutation in the *IRF6* gene (interferon regulatory factor) is associated with VWS^{11,12}, and dental anomalies, especially dental agenesis¹³.

Due to the regulatory function of *IRF6* and its relationship with dental anomalies, the oral cavity was carefully investigated in a series of nine cases of patients with VWS, which could be associated with hypodontia and dental structural changes, changes in the oral mucosa and salivary flow. After this careful evaluation, several changes were found in the craniofacial region of this group of patients that were never described before. These clinical features are illustrated on figure 3.

Diagnosis Revisiting

Curiously, the analysis of clinical features of the studied syndromes allowed to reassess and suggest different diagnoses. For instance, a month-old female patient has been under treatment in our service since 2004. She had a complete unilateral cleft lip and palate, hydrocephalus, facial asymmetry, unilateral microtia and was diagnosed with Goldenhar Syndrome. We suggested the diagnosis of Klippel Feil Syndrome (KFS) after our reevaluation. KFS is characterized by congenital fusion of two or more vertebrae leading to a short neck with limited movement with a low posterior line.

Medical and Dental Record (Syndromic Cleft Lip Palate) n: ___/___(yy)		
General Data		
Name: _____		
Birth Date: _____		
Age: _____		
Gender: _____		
Address (Street/City/State): _____		
Telephone/Email: _____		
Anamnesis:		
a) Syndrome's history (overall description)		
Type (if know): _____		
When it was diagnosed: _____ (mo/yy)		
Where it was diagnosed: _____		
Prior treatments: _____		
Cosanguineous relationships: _____		
Familial history: _____		
b) Medicines in use (Type, Dosage):		
c) Comorbidities:		
d) Medical Follow-up (where, when, how)		
Physical Examination:		
e) Extraoral examination (overall description)		
Feet: _____		
Hands: _____		
Eyes: _____		
Ears: _____		
Nails: _____		
Other: _____		
Oral Examination:		
f) CL/P Type: () L () L/P () P () unilateral () bilateral () pre-foramen () transforamen () palatal ()		
submucosal		
g) Labial Pits: () unilateral () paramedian		
h) Occlusion (Angle's classification): 1 () 2 () 3 () Mandibular position: _____		
i) Dental Abnormalities		
Hypodontia () yes () no Which elements? _____		
Dental Impaction () yes () no Which elements? _____		
Other anomalies? () yes () no Which? _____		
Teeths's size (overall): _____		
j) Enamel Defects		
Hypomineralisation () yes () no Which elements? _____		
Hypoplasia () yes () no Which elements? _____		
k) Salivary Flux (subjective) () Low () Normal () High		
l) Periodontal Disease		
Visible Plaque Index (VPI) VPI = number of faces with plaque x 100: (_____) Total number of faces _____		
m) Gingival aspect (overall): () normal () hypertrophic () inflammation		
n) Candidosis: () yes () no Where: _____		
o) Other mucosal alterations? () yes () no Description: Bifid Úvula () yes () no Narrowed palate () yes () no Ankyloglossia () yes () no Tongue surface alterations (Description): Pain in TMJ? () yes () no Pain in TMJ after articular palpation? () yes () no		
Pain in TMJ after muscles palpation? () yes () no If yes, which muscles: _____		
Evaluation of mouth aperture () normal () deviation to right () deviation to esquerda () deflection to left () deflection to right		
Pain on open and closing mouth () yes () no		
TMJ auscultation () without noise () creptation () click during opening () click during closing () click during opening and closing		
p) Treatment Needs		
Periodontal () yes () no What ? _____		
Restorative () yes () no What ? _____		
Orthodontics () yes () no What ? _____		
Surgery () yes () no What ? _____		
Prosthetic () yes () no What ? _____		
Endodontics () yes () no What ? _____		
Oral diagnosis () yes () no What ? _____		
q) Phonoaudiology:		
Speech, tongue tonicity, pharynx and proximal esophagus		
r) Photos:		
Extraoral photos (frontal and lateral profiles)		
Intraoral oral (frontal and lateral profiles)		
Date: ___/___/___		

Figure 1. Medical/dental record with direct and specific information from cleft lip and palate patients focusing orofacial data.

4 DISCUSSION

A gap in the literature exists due to the lack of systematic intra-oral and facial descriptions of individuals born with craniofacial anomalies. Here, we presented a collaborative learning strategy that we hope can address this gap by naturally forming professionals that will describe more carefully findings of craniofacial dysmorphic cases.

Higher education pedagogy has been increasingly influenced by the idea of knowledge being built in a social context, and not simply the product of individual effort or intelligence, where effective learning involves various active experiences and problem-solving² - in contrast to

the traditional didactic and instructional pedagogy, recognizing that what matters most for learning is what the student “does”¹⁴.

Although many hospitals are affiliated with a university, their main objective, unlike in a university, is the treatment of patients, leaving education often in the background in clinical care and research². Dental schools must be better integrated with their universities and academic health centers since they function as a primary source of information¹⁵. In hospitals, there are many possible options for using the spaces available for various teaching and learning activities, creating a unique opportunity to learn with innovative educational environments and

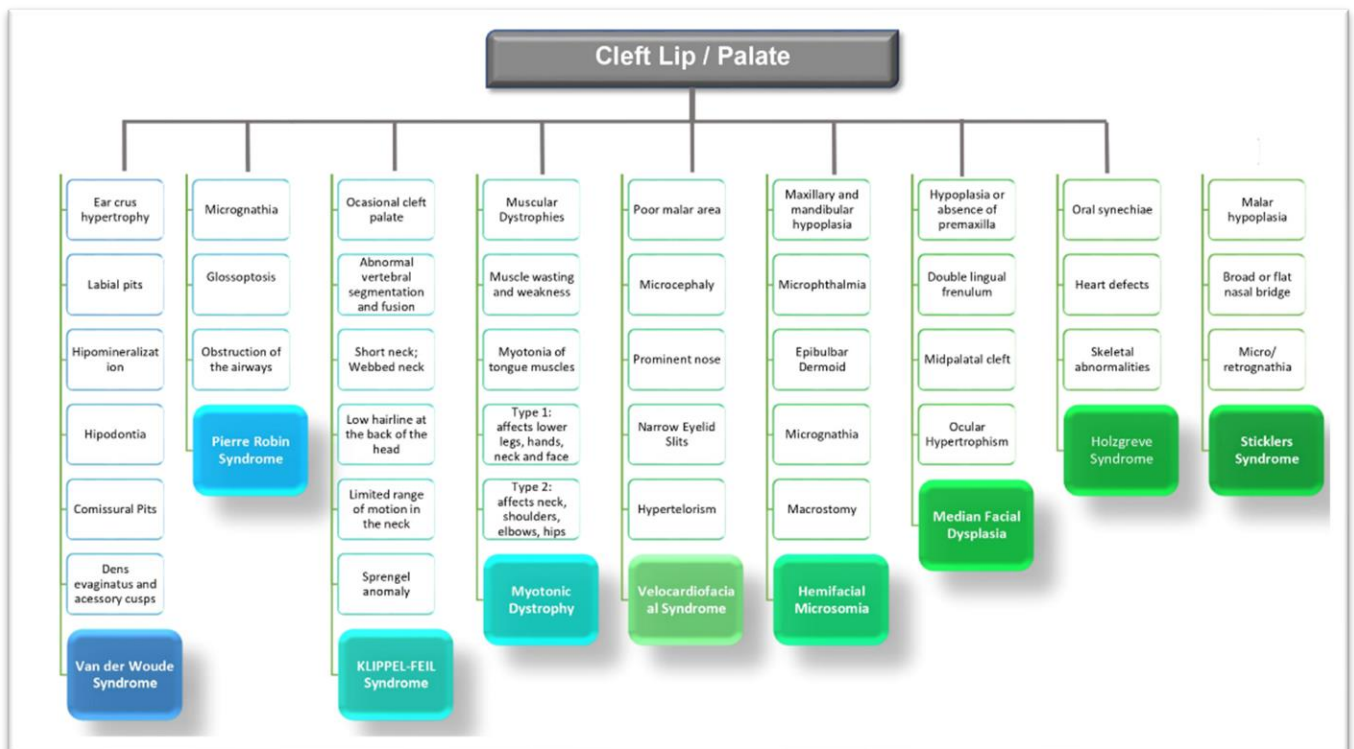


Figure 2. Guideline with main features and orofacial alterations of each syndrome

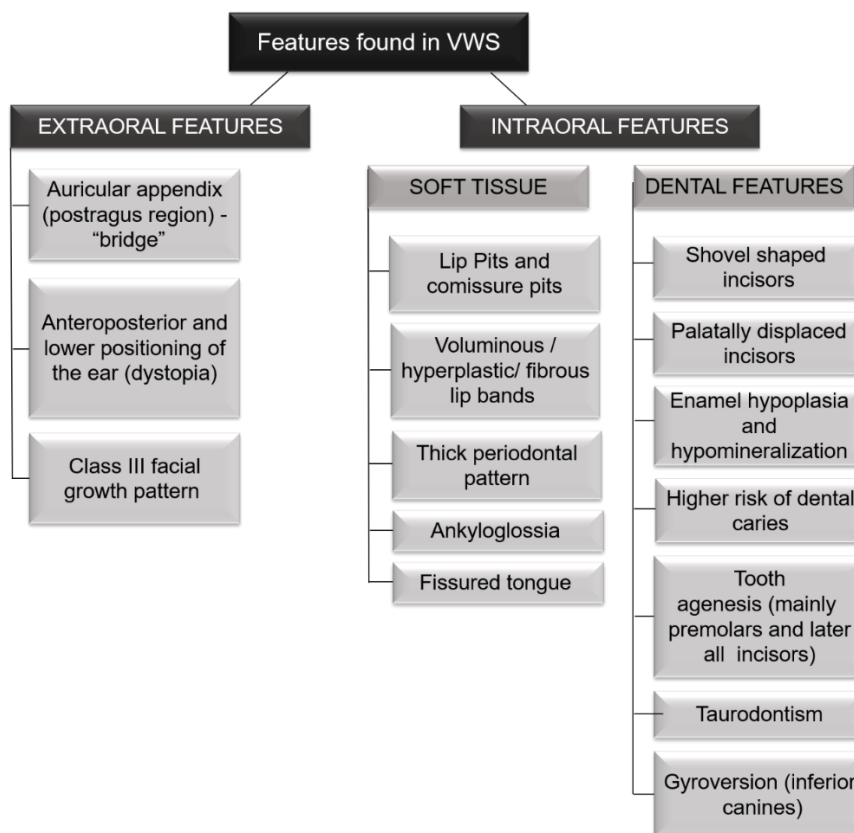


Figure 3. Extraoral and intraoral features found in Van der Woude Syndrome

favoring the possibility of adapting these concepts to the clinical context, facilitating the teaching experience of students, as well as in professional development and engagement in interprofessional activities².

Our collaborative learning experience also promoted interprofessional education, which by definition represents the performance of different professionals from different areas whose main objective corresponds to the collaboration for a service with greater resolution¹⁶. This performance contributed to the diagnosis by promoting the necessary support for patient care, space for dialogue and exhibition of ideas and works, where students and teachers were seen and heard, going according to the essential needs mentioned in the study by Chism¹⁷ (2002) for the elaboration of the "constructivist" vision of learning.

The approach used in this study shows that it is essential to use active learning methodologies that change the traditional educational model, forming a dental professional that is able to evaluate the literature, act based on scientific evidence, is a critical thinker and feels comfortable and safe in interacting professionally with other health workers, effectively participating in interdisciplinary, interprofessional education and clinical care, becoming an integral part of a primary health care team^{15,18,19}.

In his research, DePaola¹⁵ (2012) questions the possibility of creating an educational system that integrates undergraduate dentists, pre- and post-doctoral students and other health professions, such as medical residents and nursing students. In our meetings, because of the presence of dental and graduate students, in addition to the participation of faculty both local and from institutions in other regions and even outside Brazil, an extremely rich environment for discussions was created, in which collaborative

learning took place in force at all times, since each university follows a certain school of thought and has its principles and methodologies.

Loco-regional characteristics may be one of the limitations of the study, as it is not possible to extrapolate the discussions carried out using the same methodology to all scenarios, since several factors can act as limiting in the execution of the study, such as resource limitations, difficulty in access to patients, and restriction to interprofessionalization by dividing sectors that segregate professionals by areas - also, hampering effective communication for a diagnosis based on the study of patient characteristics without the need to carry out costly examinations in places with scarce resources. The present study exposes the relevance of collaborative learning, which may be applied to the study of other rare conditions.

5 CONCLUSION

The collaborative learning method allowed the creation of a clinical guideline that systematically describes orodental findings in syndromes, which may help fill the gap in the literature on orofacial findings in rare conditions, which may aid in the better understanding of the etiology of these conditions.

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RESUMO

Uso da aprendizagem colaborativa como ferramenta para avaliar anomalias craniofaciais síndrômicas

Quase 30% das fissuras orais estão associadas a outras anormalidades estruturais. No entanto, pouco se sabe sobre as características orofaciais

relacionadas a esses casos, uma vez que não são relatados de forma sistemática. Para fechar essa lacuna, desenvolvemos uma abordagem de aprendizagem colaborativa apoiada por uma equipe interprofissional com o objetivo de descrever sistematicamente os achados orais e impactar o treinamento de futuros profissionais que, esperançosamente, irão incorporar essas descrições em sua prática clínica. A proposta metodológica consistia em sessões de pequenos grupos enfocando uma determinada síndrome ou grupo de síndromes seguidas de exame de pacientes com essas condições. Vinte casos foram examinados e estudados ao longo de um semestre e foi definido um conjunto de condições a serem identificadas na região orofacial. Aqui, apresentamos uma diretriz que sugerimos que os dentistas e instituições odontológicas utilizem. Também apresentamos as vantagens de usar a aprendizagem colaborativa como uma ferramenta no treinamento do clínico.

Descritores: Fissura Palatina. Educação em Odontologia. Práticas interdisciplinares.

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