

# Haematological and Biochemical Variations in Cervico-Facial Cellulitis of Dental Origin in the City of Ouagadougou (Burkina Faso)

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## Abstract

**Background:** Cervicofacial cellulitis is a severe infection and is responsible for a major disruption of host homeostasis. The aim of this work was to describe the haematological and biochemical variations of cervico-facial cellulitis. **Methods:** This was a cross-sectional study conducted from 1 January to 31 December 2020. All patients hospitalized for cervico-facial cellulitis of dental origin were included in the study. The usual parameters of descriptive statistics were estimated for each variable. **Results:** Our sample consisted of 166 patients. The average age of patients with cervicofacial cellulitis in our study was  $39.9 \pm 15.39$  years. Red blood cell count was low in 55.5% of patients and hyperleukocytosis was noted in 89.16% of patients. Platelets were normal in 43.14% of patients and 78.43% of patients had a low haematocrit (haemodilution). Anemia was noted in 64.7% of patients. In addition, 61.0% of patients had elevated uricemia and 31.17% had elevated creatinemia. **Conclusion:** Cellulitis is still a common condition in less privileged environments. Its diagnosis can be guided by clinical and biological findings. Consistent education of the population on oral health, and the control of biological disorders that result from it, are sufficient to greatly reduce its prevalence and the appearance of complicated forms.

## Keywords

Cervicofacial Cellulitis, Teeth, Haematological Variations, Biochemical

## 1. Introduction

Cervicofacial cellulitis (CCF) or fasciitis is severe infection, sometimes necrotizing, often following a common infection, usually polymicrobial [1]. Most of the time they are due to odontogenic or pharyngeal origin, involving the aerobic and anaerobic commensal flora of the oral cavity [2]. Their prevalence is higher in young adults aged 16 - 35 years (81%) of male and disadvantaged populations with poor oral hygiene are the most exposed [3]. Many associated factors have a variable impact on the occurrence and/or clinical picture of this disease.

Cervicofacial cellulitis is responsible for a major disturbance of the biological homeostasis of the host individual, resulting in a rich and varied clinical and topographical symptomatology [4] [5] [6] [7] [8]. The biological disorders induced by cellulitis must be associated with those caused by comorbidities that may interact with it and be responsible for the appearance of severe forms [9]. The knowledge of the biological modifications consecutive to CCF in our context would allow us to detect the repercussion of CCF on the organism of the affected subjects and thus to prevent the appearance of complicated forms but also to detect the responsible germs and to propose an adapted and effective treatment.

Although cervicofacial cellulitis has already been the subject of several studies [10] [11] [12], none of them has focused on the hematological and biochemical aspects of this condition in Burkina Faso, hence the interest of our study. The general objective of this work was to describe the hematological and biochemical variations of cervicofacial cellulitis due to dental origin.

## 2. Material and Methods

Our study was conducted in the Stomatology and Maxillofacial Surgery (S/CMF) departments of the Yalgado Ouédraogo University Hospital (CHU-YO) and the Bogodogo University Hospital (CHU-B).

This was a descriptive cross-sectional study. Data were collected from January 1 to December 31, 2020. All patients hospitalized for cervicofacial cellulitis of dental origin, regardless of sex or age, in whom biological examinations were performed and consent was obtained, were included in the study.

The data were collected using a collection form developed for this purpose (attached). The variables studied included sociodemographic data, clinical data, hematological and biochemical data and management data. All hematological and biochemical variables were recorded with thresholds defined in three modalities (high value, normal value, and low value).

Data entry was done using EPIDATA software. The analysis, which was done using R software version 4.1.0, consisted of a descriptive analysis of the data. The usual parameters of descriptive statistics were estimated for each variable. These

were the proportions for the qualitative variables, the mean and the standard deviation for the quantitative variables whose distribution was normal.

The anonymity of the patients and the confidentiality of collected information were preserved. No identification data were recorded in the database or used in the analysis.

### 3. Results

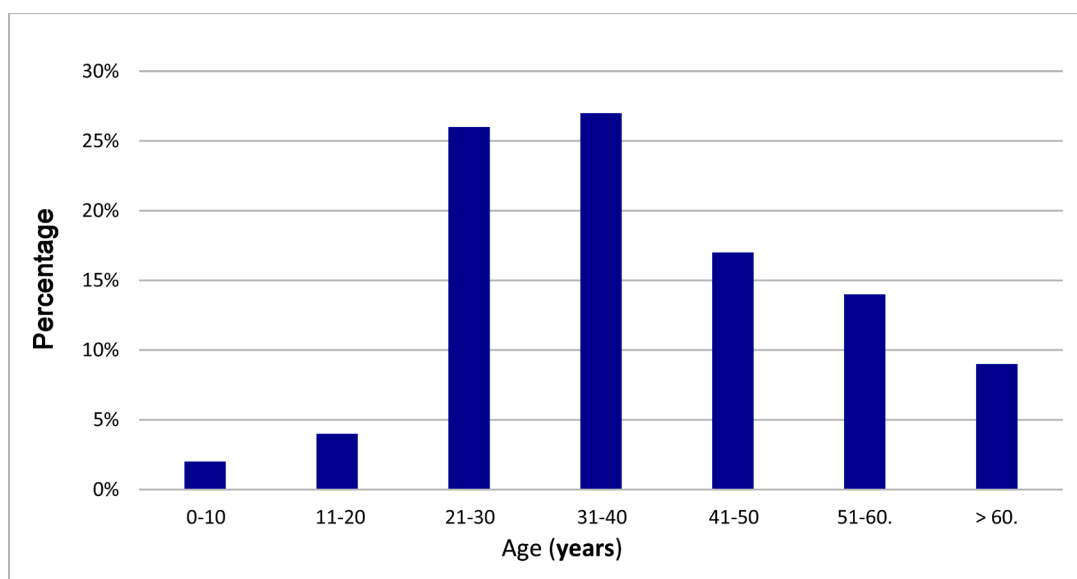
Our sample consisted of 166 patients, 156 of whom consulted at UHC-YO and 10 at UHC-B.

#### Socio-demographic characteristics

The average age of the patients with CCF in our study was  $39.9 \pm 15.39$  years with extremes of 7 and 82 years. The age groups of 21 to 40 years represented slightly more than half (53%) of the patients (**Figure 1**). Male patients represented 72.29% of the sample, a sex ratio of 2.61. Regarding marital status, 78.31% of the patients were in couples. Most of them (51.81%) did not attend school and were self-employed (66.87%) (professionals, farmers). The indigent represented 58.04% of the cases and only (1.2%) of the patients had health insurance. There were 1.8% of patients coming from abroad, particularly from Côte d'Ivoire. Among patients living in Burkina Faso, 70.48% lived in urban areas (**Table 1**).

#### Clinical characteristics

Among the 166 patients in our study, pain was reported to be the reason for consultation in 92.2% of cases. The delay of consultation was one week for 80.1% and 10.8% of the patients had a history, including 2.4% of pregnancy. Poor oral hygiene was found in 95.2% of patients and 31.3% consumed alcohol, 18.1% tobacco and 2.4% drugs. We counted a total of 56.6% of peri-mandibular cellulitis. The majority were diffuse cellulitis (78.9%) (**Table 2**).



**Figure 1.** Age distribution of patients.

**Table 1.** Distribution of patients according to socio-demographic characteristics.

Variables/Modalities	Number (n = 166)	Percentage
<b>Gender</b>		
Male	120	72.3
Female	46	27.7
<b>Marital status</b>		
Alone	36	21.7
In Couple	130	78.3
<b>Study level</b>		
Not in school	86	51.8
Primary school	63	38.0
High school and above	17	10.2
<b>Profession</b>		
Salaried employee	10	6.0
Self-employed	111	66.9
No remuneration	39	23.5
Others	6	3.6
<b>Resources</b>		
Indigent	98	59.0
Assurance	2	1.2
Personal	66	39.8
<b>Residence area</b>		
<b>Burkina</b>		
Urban	117	70.5
Semi-Urbain	36	21.7
Rural	10	6.02
<b>Côte d'Ivoire</b>		
	3	1.8

### Hematological characteristics

Patients with blood types B+ and O+ represented 33.77% and 31.13% of our sample respectively. Red blood cell count was low in 55.5% of patients and polycythemia was noted in 5.5% of patients. Hyperleukocytosis was present in 89.16% of patients, neutrophilic polynucleosis in 81.25% and hyperlymphocytosis in 10.8%. Platelets were normal in 43.14% of patients and 78.43% of patients had a decreased hematocrit (hemodilution). Anemia was noted in 64.7% of patients, the average corpuscular volume was low (microcytosis) in 35.5% and 38.24% had low average corpuscular hemoglobin content (MCHC). In addition, 15.69% of patients had hypochromia (**Table 3**).

### Biochemical characteristics

Hyperglycemia was found in 48% of tested patients. Uricemia was elevated in 61.0% as well as 31.17% had elevated creatinemia (**Table 4**).

**Table 2.** Distribution of patients according to clinical characteristics.

<b>Variables/Modalities</b>	<b>Number (n = 166)</b>	<b>Percentage</b>
<b>Reason for consulting</b>		
Pain	153	92.2
Swelling	13	7.8
<b>Consultation deadlines</b>		
First week	<b>133</b>	<b>80.1</b>
Second week	20	12.1
Third week and above	13	7.8
<b>Medical history</b>		
Diabetes	4	2.4
Cardiovascular disease	3	1.8
Pregnancy	4	2.4
Kidney disease	1	0.6
Mental illness	2	1.2
Others	4	2.4
<b>Oral hygiene</b>		
Good	8	4.8
Poor	158	<b>95.2</b>
<b>Alcohol intake</b>		
Yes	52	31.3
No	114	68.7
<b>Tobacco use</b>		
Yes	30	18.1
No	136	81.9
<b>Drug use</b>		
Yes	4	2.4
No	162	97.6
<b>Clinical forms</b>		
Circumscribed	35	21.1
Diffuse	131	<b>78.9</b>
<b>Topography</b>		
Peri-maxillary	42	25.3
Peri-mandibular	<b>94</b>	<b>56.6</b>
Cervico-thoracic	22	13.3
Others**	8	4.8

**Table 3.** Distribution of patients according to hematological data.

Variables/Modalities	Number (n = 151)	Percentage
<b>Blood Types/Rhesus</b>		
A+	34	22.5
AB+	15	10.0
B-	2	1.3
B+	51	33.8
O-	2	1.3
O+	47	31.1
<b>Red blood cells</b> (n = 166)		
Polycythemia	9	5.5
Lowered	92	55.5
<b>White blood cells</b> (n = 166)		
Hyperleukocytosis	148	89.16
Leukopenia	2	1.2
<b>Neutrophils (PNN)</b> (n = 160)		
Polynucleosis	130	81.3
Neutropenia	-	-
<b>Lymphocytes</b> (n = 102)		
Hyperlymphocytosis	11	10.8
Lymphopenia	6	5.9
<b>Platelets</b> (n = 102)		
Hyperplateletosis	44	43.1
Thrombocytopenia	5	4.9
<b>Hematocrit</b> (n = 102)		
Hemoconcentration	0	0
Hemodilution	80	78.4
<b>Hemoglobin</b> (n = 102)		
Polyglobulin	0	
Anemia	66	64.7
<b>Mean Blood Volume (MBV)</b>		
Macrocytosis	0	0
Microcytosis	36	35.3
<b>Mean corpuscular content (MCC)</b> (n = 102)		
Macrocytosis		2.9
Hypochromia		38.2
<b>Mean corpuscular hemoglobin concentration (MCHC)</b> (n = 102)		
High	12	11.8
Hypochromia	16	15.7
<b>HIV serology</b> (n = 22)		
Positive	0	0

**Table 4.** Distribution of patients according to biochemical data.

Variables/Modalities	Number (n = 2)	Percentage
<b>CRP</b>		
High	1	50.0
<b>Blood glucose</b>		
	(n = 154)	
Hyperglycemia	74	48.0
Hypoglycemia	10	6.5
<b>Uremia</b>		
	(n = 140)	
High	85	61.0
Lowered	10	7.0
<b>Creatinemia</b>		
	(n = 154)	
High	48	31.17
Lowered	32	20.78

## 4. Discussion

Our study, which aimed to describe the hematological and biochemical variations of cervicofacial cellulitis of dental origin in UHC-YO and UHC-B, has some limitations that are worth discussions. The small sample size of 166 subjects is the first limitation of our study. There is a recruitment bias due, on one hand, to the impossibility for some patients to perform biological examinations and, on the other hand, to the repeated absence of reagents in the above-mentioned subsidized centers. However, the 2 centers have a quasi-exhaustive recruitment of this pathology because they are accessible and available reference centers, so this could limit this bias.

### Socio-demographic characteristics

Cervicofacial cellulitis affects patients of all ages, but predominates in young subjects, which was noted in our study [6]. The male predominance found in the literature, Zawislak [4] in Poland, Bissa [13] in Togo and Benzarti [14] in Tunisia, is also noted in our results. This could be explained by the neglect of oral hygiene measures by men but also by the high consumption of tobacco and alcohol, which are incriminating factors in cellulitis [15]. In women, in addition to hygiene, a better immune response has also been mentioned by some authors [14] [16].

The low socio-economic and educational levels of our patients also play an important role in the genesis of cervicofacial cellulitis [15]. Indeed, the lack of financial means, which does not allow access to adequate care, often leads to self-medication and recourse to traditional therapists for the management of these infections. In our series, the number of cases of cellulitis decreased with the level of education, which could be explained by the fact that the more educated people are, the more they pay attention to their oral health.

### Clinical characteristics

The reasons for consultation found in our study were pain (92.17% of pa-

tients), and swelling (7.83% of patients). These results could be explained by the fact that in our context of ignorance and poverty, only embarrassing and/or disabling signs motivate the majority of patients to consult [7]. 80.2% of the patients consulted in the first week, and only 12.05% in the second week. The fact that 63.25% of our patients lived in Ouagadougou would be the reason for this high consultation rate in the first week. 95.18% of the patients had poor oral hygiene, 52.41% practiced self-medication, 31.3% drank alcohol, and 18.07% were smokers. These results are highly significant and only support the data in the literature regarding the role of defective hygiene, alcohol and smoking as factors favoring the occurrence of cellulitis [12] [17]. The peri-mandibular region was the most affected in our study with 56.63% of cases followed by the peri-maxillary region with 25.3%. This can be explained by the fact that the origin of the local infection is very often a posterior mandibular tooth, and the diffusion is more easily towards these regions, in the direction of the cellulosic flows [4] [18] [19] [20]. Diffuse forms (78.92%) were more numerous than circumscribed forms (21.08%). This could be explained by the preponderance in our study of favourable factors such as self-medication with NSAIDs, smoking, traditional therapy. These factors weaken the host immune response, thus leading to the emergence of severe forms [7] [19] [21].

#### **Hematological characteristics**

More than half of our patients (55.42%) had a low red blood cell count and 9 (5.42%) had polycythemia. This decrease in red blood cells could be explained by the presence of bleeding (3.61%) which is responsible for the decrease in the figurative elements of the blood. This bleeding, when important, can be responsible for hypotension with or without renal damage.

The majority of our patients (89.16%) had a hyperleukocytosis on the blood count. The elevation of the white blood cell count is frequent in cellulitis [4] [6], it shows the extent of the infectious process and is due to an increase in the number of neutrophils. In the most severe cases, sepsis with multivisceral failure (mediastinitis, cervical infection, etc.) can occur, which can rapidly lead to death in the absence of adequate therapeutic measures. In our series, the figures are higher than those presented by Sawadogo [21] and El Ayoubi [16] in their studies which found respectively a hyperleukocytosis in 77.83% and 73% of the patients. Our results are lower than those of Diarra [22] who found hyperleukocytosis in 96.6% of cases.

In our study 83.3% of patients had normal lymphocyte counts; 10.8% had hyperlymphocytosis. This could be explained by the fact that cervicofacial cellulitis of dental origin is mainly due to bacteria including group B  $\beta$ -hemolytic streptococcus and/or staphylococcus Aureus. As a rule, lymphocyte levels increase in response to viral stimuli. The increased number of lymphocytes could be due to a viral attack, particularly of the ENT sphere, evolving concomitantly with the cellulitis.

About 43.14% of the patients in our study had hyperplaquetosis. This is a reactive thrombocytosis which could be explained not only by the chronic in-



flammation but also by the infectious syndrome following the cellulitis. It can be the cause of numerous complications including thrombosis of the vessels of the face such as the cavernous sinus and the facial vein, with a consequent drainage deficit in the anatomical area concerned. Hyperplaque may also result in bruising or mucocutaneous hemorrhages such as nosebleeds or gum bleeds.

In our study 78.43% had a lowered hematocrit (hemodilution). This could be explained by several factors the clinical anemic syndrome seen on clinical examination marked by skin and mucous membrane pallor in 72.89% of cases. The decrease in hematocrit level often reflects anemia.

Anemia was noted in 64.7% of our patients. The clinical signs of anemia were observed in several of our patients, including the paleness of the conjunctiva, asthenia, the presence of bleeding, and the presence of pregnant women. Here we have anemia by blood spoliation due to bleeding. If not managed, it can potentially lead to cardio-respiratory complications, in particular dyspnea, tachycardia, palpitation, neurological complications with consciousness disorders, but also renal complications, as hypovolemia will eventually lead to functional renal failure. These rates that we report in our study are higher than those of Sawadogo [21] and Konsem [18] who found anaemia at the haemogram respectively in 46.55% and 8% of their patients.

HIV infection is a significant factor in the development of CCF, as it leads to a progressive deficit in cellular immunity. HIV-positive patients have an increased susceptibility to opportunistic infections. Moreover, it has been shown that seropositivity increases the risk of developing severe forms of CCF [22]. Among 22 patients tested, none was seropositive. Kouakou [23] found a seropositivity rate of 14.49%. Badou [24] found 9.6% of patients to be HIV positive.

Microcytosis (35.5% of patients in our study) could be explained by the chronicity of inflammatory anemia and excessive iron storage in the liver reserves.

The most affected blood groups in our study were B+ (33.77%) and O+ (31.13%). In the absence of sufficient data in the literature on the correlations that could exist between blood grouping and cellulitis, we can only limit ourselves to this observation, hoping that further studies will provide sufficient evidence on the existence or not of a correlation between blood grouping and genesis of dental CCFs.

#### **Biochemical characteristics**

C-reactive protein (CRP) was not systematically requested. Indeed, this determination is justified for the research and the follow-up of an inflammatory process. Moreover, the precariousness of the situation led the patients to carry out only the most urgent examinations. CRP has an opsonizing action favoring the phagocytosis of apoptotic cells and activates the T complement.

Hyperglycemia (48.0%) was found in 4 patients. El Ayoubi [16] found hyperglycemia in 20% of cases, hypoglycemia was found in 1.7% of patients. Blood glucose disorders involve the regulatory mechanism of the pancreas, whose insulin ensures the lowering of blood glucose and promotes the use of glucose by the tissues. Diabetes resulting from chronic hyperglycemia is one of the factors fa-

voring cellulitis reported by several authors [25] [26] [27].

The high rate of uricemia (61%) could be explained by the extensive tissue necrosis that takes place during the pathology. Its increase in the blood is synonymous with renal damage and or hypercatabolism situation as it is the case in our study. The increase of creatinemia could be explained by a progressive deterioration of the kidneys due to the joint action of the factors mentioned above. In the absence of management, the symptoms evolve towards parenchymal renal failure. In the literature, Sawadogo [21] found an increase in creatinemia in 15.33% of cases.

## 5. Conclusion

Cellulitis is a pathology that is still frequent in less privileged environments. It affects mainly young male adults but can affect both men and women, regardless of age. Its diagnosis can be guided by clinical and biological findings. Anemia, hyperleukocytosis and hyperplateletosis, and hypercreatinemia can be life-threatening if not well controlled. In addition, the consumption of alcohol, tobacco and certain comorbidities such as diabetes are aggravating factors that can cause the appearance of complicated forms. A consequent education of the population on oral health, and the control of the biological disorders which result from it are sufficient to strongly decrease its prevalence and the appearance of complicated forms.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] Blancal, J.-P., Kania, R., Sauvaget, E., Huy, P.T.B., Mateo, J., Guichard, J.-P., *et al.* (2010) Prise en charge des cellulites cervicofaciales en réanimation. *Réanimation*, **19**, 297-303. <https://doi.org/10.1016/j.reaurg.2010.04.001>
- [2] Razafindrabe, J., Randriamanantenasoa, V., Andrianasolo, M., Radaviarison, J., Rasoarimasy, V. and Rakotovao, J. (2007) Epidemiological and Clinical Aspect of Dental Cellulitis in Antananarivo. *Journal of Medical Sciences*, **7**, 1108-1111. <https://doi.org/10.3923/jms.2007.1108.1111>
- [3] Fofana, A., Keita, M., Beye, S., Doumbia-Singaré, K., Drame, B., Timbo, S., *et al.* (2017) La Cellulite cervico-faciale et thoracique en milieu défavorisé à Ségou au Mali. *Revue Malienne d'Infectiologie et de Microbiologie*, **9**, 2-10.
- [4] Zawiślak, E. and Nowak, R. (2021) Odontogenic Head and Neck Region Infections Requiring Hospitalization: An 18-Month Retrospective Analysis. *BioMed Research International*, **2021**, Article ID: 7086763. <https://doi.org/10.1155/2021/7086763>
- [5] Alotaibi, N., Cloutier, L., Khaldoun, E., Bois, E., Chirat, M. and Salvan, D. (2015) Criteria for Admission of Odontogenic Infections at High Risk of Deep Neck Space Infection. *European Annals of Otorhinolaryngology, Head and Neck Diseases*, **132**, 261-264. <https://doi.org/10.1016/j.anorl.2015.08.007>
- [6] Bertolus, C. (2011) Cellulite Cervico-Faciale. *Conférences. Infections cutanées. URGENCES* 2011, Vol. 52, Paris, 593-600.

- [7] Keita, A., Fofana, M., Diallo, I., Diallo, M., Keita, M. and Fofana, F. (2018) Les cellulites cervico-faciales: Facteurs favorisants, aspects épidémiologique, clinique, thérapeutique et évolutive au service d'Otorhinolaryngologie et de Chirurgie Cervico-Faciale de l'Hôpital Régional de Kankan, Guinée-Conakry. *Jaccr Africa*, **2**, 261-268.
- [8] Cavaillon, J.-M. (2005) Médiateurs de l'inflammation. In: Martin, C. and Vincent, J.-L., Eds., *Sepsis sévère et choc septique*, Springer, Paris, 23-49. [https://doi.org/10.1007/2-287-27496-0\\_2](https://doi.org/10.1007/2-287-27496-0_2)
- [9] Traore, I., Beogo, R., Traore, A., Coulibaly, T., Millogo, M. and Ouedraogo, N. (2012) Caractéristiques et déterminants de la létalité de la cellulite aiguë diffuse de la face. *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **19**, 20-23.
- [10] Eboungabeka Trigo, E., Mabika, B., Bancolé Pognon, S., Moussa, M. and Magnomé, J. (2020) Les Cellulites Cervico-Faciales chez la Femme enceinte au CHU de Brazzaville: A Propos de 31 Cas. *Health Sciences and Disease*, **21**, 82-87.
- [11] Garé, J., Guiguimé, W., Millogo, M., kouamé, P. and Konsem, T. (2019) Facteurs associés à la mortalité des cellulites cervicofaciales dans le service de stomatologie et de chirurgie maxillofaciale du Centre Hospitalier Universitaire Yalgado Ouédraogo (CHU-YO). *Revue Ivoirienne d'Odonto-Stomatologie*, **21**, 33-41.
- [12] Bennani-Baïti, A.A., Benbouzid, A. and Essakalli-Hossyni, L. (2015) Cervicofacial Cellulitis: The Impact of Non-Steroidal Anti-Inflammatory Drugs. A Study of 70 Cases. *European Annals of Otorhinolaryngology, Head and Neck Diseases*, **132**, 181- 184. <https://doi.org/10.1016/j.anorl.2015.06.004>
- [13] Bissa, H., Adam, S., Amana, B., Winga, F., Essobozou, P., Lawson, L., *et al.* (2019) Cellulites Cervico-Faciales D'origine Dentaire au CHU Sylvanus Olympio de Lome Au Togo. *European Scientific Journal, ESJ*, **15**, 70-80. <https://doi.org/10.19044/esj.2019.v15n36p70>
- [14] Benzarti, S., Mardassi, A., Mhamed, R., Hachicha, A., Brahem, H., Akkari, K., *et al.* (2007) Les cellulites cervico-faciales d'origine dentaire: A propos de 150 cas. *J Tunis ORL Chir Cervico-Faciale*, **19**, 24-25.
- [15] Institut national d'excellence en santé et en services sociaux (INESSS) (2017) Cellulite infectieuse chez l'adulte et l'enfant. Institut national d'excellence en santé et en services sociaux (INESSS), Québec, 1-92.
- [16] El Ayoubi, A., El Ayoubi, F., Mas, E., Guertite, A., Boulaïch, M., Essakalli, L., *et al.* (2009) Cellulites cervico-faciales diffuses d'origine dentaire: A propos de 60 cas. *Médecine Buccale Chir Buccale*, **15**, 127-135.
- [17] Haitami, S., Kissi, L., Hamza, M., Rifki, C. And Yahya, I.B. (2016) Les cellulites cervico-faciales d'origine dentaire: Etude transversale. *Revue d'OdontoStomatologie*, **45**, 300-309.
- [18] Konsem, T., Millogo, M., Ouédraogo, D., Zidwemba, N. and Ouoba, K. (2012) Les cellulites diffuses cervico-faciales au centre hospitalier universitaire Yalgado Ouédraogo (Ouagadougou Burkina Faso). *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **19**, 303-304.
- [19] Ngouoni, B., Ngotne, R., Mbitsi-Ngoma, H. and Mosimbi, N. (2008) Cellulites diffuses sous mandibulaires d'origine dentaire. *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **15**, 38-42.
- [20] Bengono, C., Bitá, R., Avang, N., Mengong, H. and Bengono, G. (2006) Cellulites et phlegmons d'origine dentaire au CHU de Yaoundé. *Odonto-Stomatol Trop Trop Dent J*, **113**, 23-26.

- [21] Sawadogo, R. (2018) Cellulites cervico-faciales graves d'origine dentaire: Aspects épidémiologiques, cliniques et prise en charge dans le Service de Stomatologie et de Chirurgie Maxillo-Faciale (S/CMF) du Centre Hospitalier Universitaire Yalgado OUEDRAOGO (CHU/YO). Thèse de médecine, Université Ouaga I Pr Joseph Ki ZERBO, Ouagadougou-Burkina Faso.
- [22] Diarra, K. (2015) Cellulites Cervicales Diffuses: aspects épidémiologique clinique et thérapeutique dans le Service ORL-CCF CHU Gabriel TOURE. Thèse de Médecine, Université des sciences, des techniques et des technologies de Bamako, Bamako-Mali.
- [23] Kouakou, K., Ouattara, B., Sidibé, O., Boka, B., Daweni, J. and Koffi, M. (2018) Cellulites cervico-faciales diffusées et nécrosantes: aspects épidémiologiques, cliniques et thérapeutiques en 15 ans au CHU de Cocody (Côte d'Ivoire). *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **25**, 5-9.
- [24] Badou, K., Buraima, F., Yoda, M., Traore, K., Kouassi, Y, Tanon-Anoh, M., *et al* (2014) Cellulites cervico-faciales au centre hospitalo-universitaire de Yopougon (Abidjan-cote d'ivoire). *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **21**, 5-10.
- [25] Dédjan, A.-H., Haraj, N.-E., El Aziz, S. and Chadli, A. (2016) Les cellulites cervico-faciales chez le diabétique. *Médecine des Maladies Métaboliques*, **10**, 309-313. [https://doi.org/10.1016/S1957-2557\(16\)30117-1](https://doi.org/10.1016/S1957-2557(16)30117-1)
- [26] Assouan, C., Anzouan-Kacou, E., Aka-Adouko, J., Millogo, M., N'guessan, D., DIOMANDE, A., *et al.* (2012) Prise en charge des cellulites chez le diabétique. *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **19**, 16-19.
- [27] Diallo, O., Balde, N., Condé, B., Camara, S. and Bah, A. (2006) Les cellulites cervico-faciales chez le patient diabetique au chu de Conakry. *Revue Internationale du College D'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **13**, 13-16.

## Annex

<https://docs.google.com/document/d/13BOeqHIFvcto0KwaYhrym7hkpK7sl-pm/edit?usp=sharing&ouid=103872500155260047162&rtpof=true&sd=true>