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Review

Analysis of the prevalence of dental origin of deep neck infections

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ABSTRACT

Objective: The objective of the study is to know the incidence of dental cause of deep neck infections (DNI) through systematic literature review and meta-analysis.

Methods: systematic review on PubMed, Scopus and Cochrane Library Plus with strategy (((deep neck) OR (parapharyngeal [All Fields] AND ('abscess' [MeSH Terms] OR 'abscess' [All Fields]))) AND (((('microbiology'[Subheading] OR 'microbiology'[All Fields] OR 'microbiology'[MeSH Terms])))). It was estimated the proportion of cases of dental origin according to models of random effects, the heterogeneity through inspection of the forest-plot and estimate of I² and publication by the LFK index and diagram bias weighted funnel-plot.

Results: We selected 19 (3091 patients with DNI) studies that estimated dental origin in 1380 (pooled prevalence: 36%;) (95% CI 24%–49%). The heterogeneity of the studies is high and statistically significant (I² = 98.03%, 95% CI 97.57% 98.40%; Cochran's Q = 912,83). There were no graphical or statistical signs of publication bias (LFK index = -1.09).

Conclusions: Relationship between dental origin and variables as the affected areas, the microorganisms isolated or complications cannot be drawn. It is necessary to perform new studies with better records of data related to DNI, systematizing the criteria for diagnosis and localization of infection.

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☆ AsianAOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

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1. Introduction

Deep neck infections (DNI) affect deep cervical spaces, delimited by the deep neck fascia (submandibular, parapharyngeal and retropharyngeal) [1]. Behind retropharyngeal space, and up to D1-D2 level extends the danger space, which can be a path of infection spreading to the mediastinum [1,2].

DNI usually origin in a septic focus from the oral cavity, oropharynx, paranasal sinuses or salivary glands and they can develop from lymphadenitis, thyroiditis, infection of congenital cysts or neoplasms [2,3]. Spreading of the infection can occur by continuity, lymphatic or hematically with significant muscle necrosis and local symptoms (swelling, dyspnea, dysphagia, cervical stiffness) [4] that compromise patient’s life in a few hours [1,5,6]. The most frequent cause is pharyngotonsillitis in children and dental disease caused by oral and anaerobic pathogens in adults [2,3].

Using the plane of the hyoid bone as reference, DNI are located above (buccal, parotid, periamigdaline, submandibular, masticator –masseter, pterygoid and temporal–), below (anterior visceral or pretracheal space) or along the neck (parapharyngeal, retropharyngeal, danger space, prevertebral and visceral vascular) [1,5,7].

DNI are usually polymicrobial. The most common pathogens are *Streptococcus viridans*, *Streptococcus milleri*, *Prevotella spp*, *Peptostreptococcus spp* y *Klebsiella pneumoniae* [2]. In those considered from odontogenic origin, *Streptococcus*, *Peptostreptococcus*, *Veillonella*, *Lactobacillus*, *Corynebacterium* y *Actinomyces* represent more than 80% of the cultivated flora [8].

Odontogenic ICP come from dentoalveolar infections (pulp and periapical abscess), gingivitis (acute or chronic), periodontitis (including pericoronitis), periimplantitis, infections of the subaponeurotic spaces, osteitis and osteomyelitis [8] of premolars and molars [7]. Association of oral bacteria with extraoral pathologies is under investigation [9–11].

Bascones et al. [8], published a consensus document on DNI of dental origin that established the oral pathogens associated with the most frequent oral pathologies; the identificación of these microorganisms in the cultures from DNI and the oral exploration contribute to determine the dental cause of the infection. The diagnosis of the origin of the infection must be established through otorhinolaryngological, odontological and microbiological examination. The diagnostic imaging of choice of DNI is computed tomography [1,4].

The treatment of DNI is medical (antimicrobial association) and surgical (puncture or surgical drainage that also allows the collection of samples for microbiological culture) [1,4,7].

DNI suppose a high risk for the patient and increase costs due to diagnostic procedures, medical and surgical treatments, complications, intensive care unit stay and increased hospital stay [2,5,12,13]. Also, the high costs of dental treatments, the lack of public coverage of odontologic assistance may contribute to the expansion of odontogenic infections to deep neck spaces [14]

The incidence of the dental origin of DNI is very variable in the literature so it is not clearly established and this information may be very useful for its prevention by acting on oral diseases, especially caries and periodontal disease.

The aim of this paper is to know the incidence of the dental cause of deep cervical abscesses through a systematic bibliographic review.

Table 1

General data of the sample in selected studies.

	n	%, CI 95%
Total patients	3091	
Male	1299	64,05 ^a [61,94–66,11]
Female	729	35,94 ^a [33,89–38,06]
Gender non specified	1063	34,4 ^b [32,74–36,1]
Infection origin		
Dental	1380	44,6 [43–46,4]
Other	1711	55,4
Pharyngotonsillitis	440	14,2
Other upper airways infections	122	3,9
Sialadentitis	151	4,9
Previous lymphadenitis	70	2,3
Congenital cervical cysts	62	2,0
Thyroiditis	4	0,1
External trauma/foreign body/insect bite	58	1,9
Tumor	11	0,4
Affected cervical spaces		
Non specified	1191	38,53 [36,83–40,26]
Specified	1900	61,47 [59,74–63,17]
Spaces above the hyoid bone	1399	54,54
Spaces below the hyoid bone	117	4,56
Spaces along the neck	631	24,60
Several spaces affected	418	16,30
Complications		
Any complication (local, regional or distant)	519	16,79 [15,52–18,15]
Locales	30	0,97
Regional (fist, recurrent nerve palsy, vascular –jugular thrombosis–)	204	6,60
Cardiopulmonary	67	2,17
Mediastinitis	93	3,01
Other organs (kidney, CNS)	32	1,04
Sepsis	93	3
Death	30	0,97

^a In regard to the total in which gender is specified (n = 2028).

^b In regard to the total sample (n = 3091).

2. Material and methods

A systematic review was conducted on the proportion of deep cervical abscesses of the dental cause. The search was done by two researchers in the PubMed, Scopus (includes EMBASE) and Cochrane Library Plus databases with the terms and results shown in Fig. 1, according to the PRISMA model [15].

2.1. Inclusion and exclusion criteria

The present review included observational studies, clinical trials or meta-analysis in English or Spanish, published from January 1st, 2006 to December 31st, 2016, which include adults, in which the dental cause and other causes are identified and microbiology is specified.

As for exclusion criteria clinical cases, case series that only include children, those that only identify a microorganism and those that refer to an exclusive group of patients or pathology were excluded.

We selected 26 papers in the qualitative synthesis, of which finally 19 were included for the quantitative synthesis [16–34].

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