

ANTIBIOTICS PROPHYLAXIS IN DENTISTRY IS UNNECESSARY AND POTENTIALLY DANGEROUS. A CONSCIOUS USE: CLEANER IS SAFER

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ABSTRACT

Background: Antibiotics are life-saving drugs when used wisely. However, Antimicrobial Resistance (A.M.R.) is both a global public health and a patient safety problem. Around 10% of all antibiotic prescriptions worldwide come from the dental sector and at least 80% are estimated to be unnecessary.* Administering either ampicillin with clavulanic acid or a broad-spectrum antibiotic as a perioperative prophylaxis (P.A.P) is very common practice in dentistry. This protocol has become a clinical habit, although the real need is still much debated in literature. The time is ripe to consider a paradigm shift. Materials and methods: An alternative prophylactic approach has been utilized to avoid the use of antibiotics in dental surgery (P.A.P). These procedures were followed up on by phone call the day after surgery, one week later when sutures were removed, and at a one-month post-op check-up. When indicated (i.e. wisdom tooth extraction, implant placement, regenerative therapy), an x-ray was taken after six months and then once a year. Once healed, the patients had regular scheduled cleanings and basic check-ups over a period ranging from one to fifteen years, respectively 2004-2019. The different types of surgeries and various adverse reactions and/or complications which occurred were collected, analyzed and discussed.

INTRODUCTION

At a San Francisco dental meeting over twenty years ago, I heard a pharmacologist's report about a very dangerous *Andromeda Strain*. He had cited a famous American writer, Michael Crichton**, he had competently anticipated what is today known as Antimicrobial Resistance (A.M.R.): bacteria once sensitive to a certain class of antibiotics have become resistant and pose a serious risk to the health of the whole world. A.M.R has since gained the attention of the health ministries of all countries around the world.^[1,2,3,4,5] The pharmacologist's warning was aimed at dentists, and ear, nose and throat (ENT) specialists who, according to his report, were prescribing over 30 million antibiotic tablets a day, often due to an empirical habit not supported by the pharmacological principle that must guide correct antibiotic therapy.^[6] Therefore, my team and I started to put clinical emphasis on improving patients' dental hygiene habits^[7], operating "cleanly"^[8] and in a clean environment^[9, 10] without using P.A.P. Our protocol included, phase one therapy^[11], checking the patient's adherence to new oral hygiene instructions, verifying their compliance and being sure to have obtained

stability^[12] over time, i.e. what the normal approach to care for every dental patient should be. Once this had been established, we stopped prescribing perioperative antibiotics in nonsurgical, surgical and endodontic treatments, unless strictly necessary.^[13]

During a clinical observation period of three years, between 2001 and 2004, we were able to observe the validity of this prophylactic approach. We started from 2004, after having collected our patients' written informed consent, to follow every patient postoperatively who had undergone surgery without P.A.P.

MATERIAL AND METHODS

6,522 patients needing surgery between 2004 and 2019 were enrolled in this clinical perspective observational study looking for infectious complications during the healing period. Prior to surgery, each patient was examined for residual plaque. If necessary, a preoperative cleaning was performed. This step aimed to ensure that the patient's oral microbiome had undergone a perceptible and favorable shift following initial

hygiene interventions.

The surgical procedures involved in the study have been divided into five large groups for descriptive convenience. Each group contains categories based on clinical or administrative differences:

- Sinus Surgery
- Periodontal Surgery
- Regenerative surgery
- Mucogingival surgery
- Implant surgery

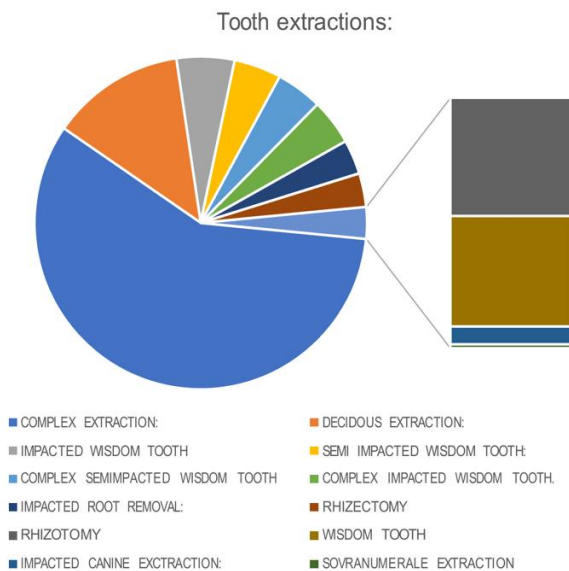
The five groups

- Tooth extractions
- Oral surgery

Include the following categories:

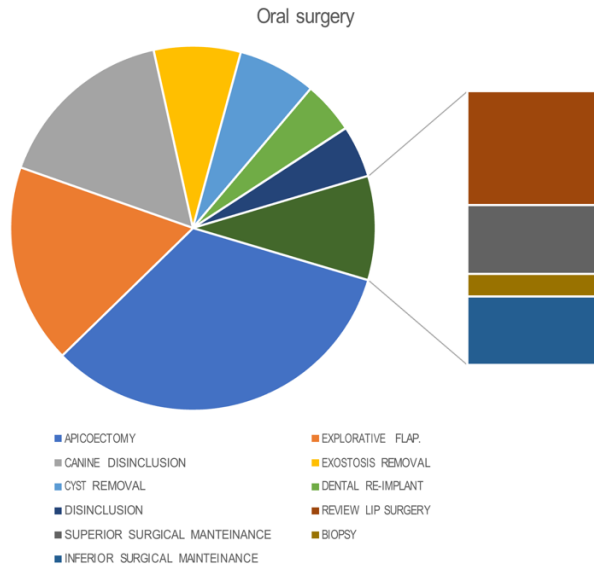
1. Tooth extractions: total cases 2285

COMPLEX EXTRACTION	1327
DECIDUOUS EXTRACTION	298
IMPACTED WISDOM TOOTH	129
SEMI-IMPACTED WISDOM TOOTH	105
COMPLEX SEMI-IMPACTED WISDOM TOOTH	103
COMPLEX IMPACTED WISDOM TOOTH	102
IMPACTED ROOT REMOVAL	76
RHIZECTOMY	75
RHIZOTOMY	33
WISDOM TOOTH	31
IMPACTED CANINE EXCTRACTION	5
SUPERNUMERARY EXTRACTION	1



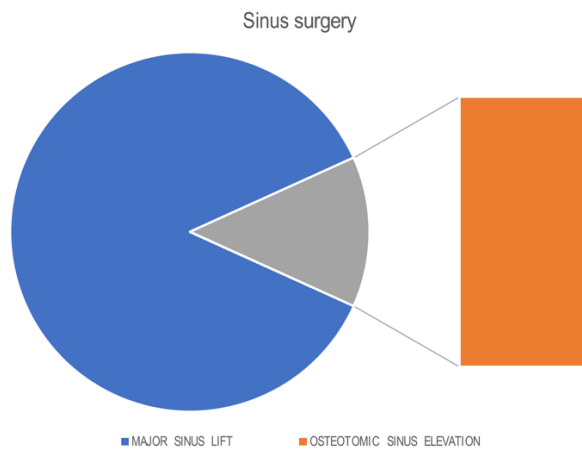
2. Oral surgery: total cases 128

APICOECTOMY	43
EXPLORATIVE FLAP	23
CANINE DISINCLUSION	21
EXOSTECTOMY	10
CYST REMOVAL	9
DENTAL RE-IMPLANT	6
DISINCLUSION	6
REVIEW LIP SURGERY	5
UPPER SURGICAL MANTEINANCE	3
BIOPSY	1
LOWER SURGICAL MAINTAINANCE	1



3. Sinus surgery: total cases 362

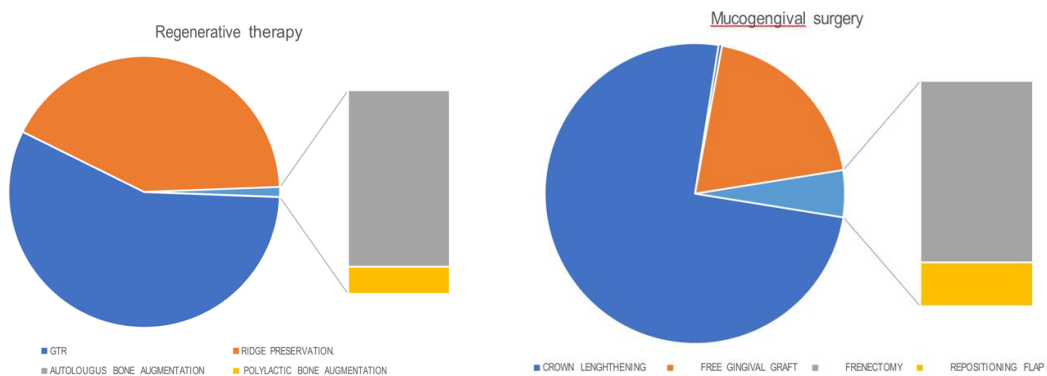
MAJOR SINUS LIFT	313
OSTEOTOMIC SINUS ELEVATION	49



4. Periodontal surgery

a. Regenerative therapy: total cases 1264

GTR	717
RIDGE PRESERVATION	532
AUTOLOGOUS BONE AUGMENTATION	13
POLYLACTIC BONE AUGMENTATION	2

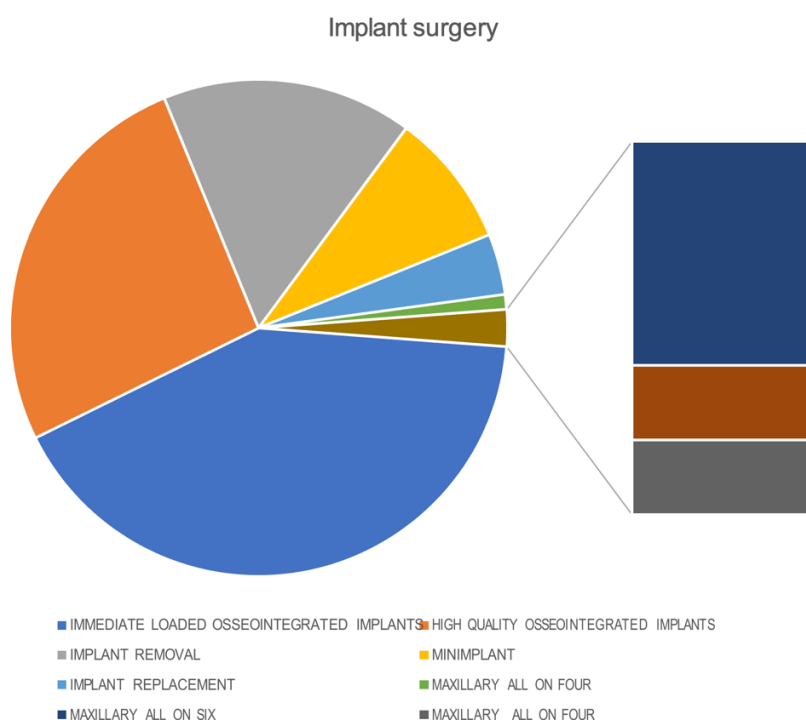


b. Mucogingival surgery: total cases 816

CROWN LENGTHENING	615
FREE GINGIVAL GRAFT	160
FRENECTOMY	33
REPOSITIONING FLAP	8

5. Implant surgery: total cases 1667

IMMEDIATE LOADED OSSEOINTEGRATED IMPLANTS	692
HIGH QUALITY OSSEOINTEGRATED IMPLANTS	435
IMPLANT REMOVAL	272
MINI IMPLANT	146
IMPLANT REPLACEMENT	66
MAXILLARY ALL ON FOUR	16
MAXILLARY ALL ON SIX	24
MANDIBULAR ALL ON FOUR	8
MAXILLARY ALL ON MANDIBULAR ALL ONSIX	8



The rationale for adopting a non-antibiotic prophylactic protocol was thoroughly explained to all patients and, when appropriate, to their family physicians or referring specialists. Informed written consent was obtained from all patients, along with acknowledgment and support from their medical caregivers, when applicable.

RESULTS

Antibiotics were prescribed in a total of 68 clinical cases out of 6,522 oral surgeries corresponding to a percentage of 1.043 %. However, when analyzing the patients' medical records to understand why antibiotics were prescribed, we found that:

- Only 13, corresponding to 0.19 % of all the surgeries, presented a real tissue infection (i.e. simultaneously showed signs of redness, pain, swelling and function loss).
- 14 patients (0.21%) took them for medical prophylaxis (i.e. kidney transplant, diabetes or heart disease).

- 16 patients (0.25%) took antibiotics at their doctor's suggestion.
- 25 patients (0.38%) took antibiotics on their own initiative.

Out of the 25 patients who took them on their own initiative, 6 were doctors themselves. Therefore, trusting one's doctor and prescribing unessential antibiotics amounted to a total of 22 patients (0.34%).

Thus, 41 out of 68 patients (60.29 %) took antibiotics without a real need.

In most of these instances, antibiotics were taken at the earliest signs of pain or swelling, not due to confirmed infection.

Typical examples include crown lengthening, free

gingival grafts, frenectomy, and complex extractions (especially of wisdom teeth), where discomfort led to preemptive antibiotic use out of fear rather than clinical necessity.

Sinus surgeries served as a sensitive indicator of the efficacy of this antibiotic-free prophylactic approach. Between 2001 and 2004, the team observed a higher rate of infection in sinus lift procedures compared to other surgeries. However, after collaborating with an ENT specialist who adopted the same antibiotic-free philosophy, this complication rate decreased substantially.

Patients with a history of sinusitis or recurrent upper respiratory infections underwent rhinoscopy prior to surgery. When necessary, preoperative treatment involved nasal rinses and short-term anti-inflammatory therapy. Once nasal cavity ventilation was restored, infection rates in sinus lift surgeries aligned with those observed in other procedures described in this study.

DISCUSSION

The World Health Organization (WHO) classifies antimicrobial resistance (A.M.R.) as one of the most severe threats to global health. This issue, although widespread, remains insufficiently recognized by both professionals and the general public.

Every year in Europe, there are more than 670,000 cases of infections caused by antibiotic-resistant bacteria. Approximately two-thirds require hospital treatment and are responsible for over 33,000 deaths and nearly 875,000 DALYs (Disability-Adjusted Life Years—years of healthy life lost due to illness).^[3]

Antibiotics must be administered only when necessary, at the appropriate minimum inhibitory concentration (MIC) and for a duration based on clinical evidence. However, these conditions are difficult to meet in dentistry due to:

- The complex microbial diversity of the oral cavity, especially in poorly maintained mouths.
- The extremely low antibiotic concentrations achievable in gingival crevicular fluid (often in picograms).

As such, clean surgeries in sterile environments, combined with well-maintained oral hygiene and biofilm control, appear significantly more effective in preventing postoperative complications than routine perioperative antibiotic prophylaxis.

Furthermore, modifying the oral microbiome through non-antibiotic means (professional hygiene, patient compliance) supports both local and systemic health.^[15-17]

Despite the progress in reducing antibiotic use in intensive livestock farming, <<the medical profession—dentistry included—remains behind in acknowledging

the full scope of this threat>>. The “blind” prescription of antibiotics contributes directly to the growth of resistant bacterial strains.

Barriers to Changing Prescribing Habits

During the early phases of this study, several challenges arose:

- Dentists found it difficult to justify the withdrawal of antibiotics to patients who expected them or had previously received them.
- Patients’ family doctors or specialists often prescribed antibiotics regardless of the dental team’s guidance. To overcome this, the team initiated direct dialogue with referring physicians, which helped establish therapeutic alignment and patient reassurance.
- many official dental guidelines still recommend perioperative prophylaxis, which may deter clinicians from diverging, even when evidence supports it.

CONCLUSIONS

Although this study does not include a control group, the sheer volume and variety of cases provide robust observational insight.

Despite the study’s limitations, particularly the absence of comparative data using conventional protocols, the findings strongly support that antibiotic-free perioperative management can ensure safe, infection-free outcomes in over 99.8% of cases.

This study provides substantial evidence that routine use of perioperative antibiotics in dentistry can be avoided in most cases, without increasing the risk of postoperative infections.

The approach described here—based on meticulous oral hygiene, clean surgical technique, and case-by-case clinical evaluation—has proven highly effective and safe.

While the lack of a control group limits the statistical strength of the study, the large sample size, the diversity of surgical procedures, and the long observational period (15 years) lend weight to the results.

The findings suggest that a carefully implemented antibiotic-free protocol can ensure optimal healing in over 99.8% of dental surgeries.

This could potentially lead to a paradigm shift in perioperative prophylaxis in dentistry.

However, we recognize that future prospective, controlled studies are needed to confirm these results and to refine protocols for broader adoption.

With this publication, we aim to:

- Encourage further research into non-antibiotic-based prophylaxis.
- Support clinicians who wish to adopt more evidence-based, conservative prescribing habits.
- Contribute to the global effort to combat antimicrobial resistance through more responsible and individualized antibiotic use.

In conclusion, this study highlights the critical role of clinician awareness, patient education, and interdisciplinary collaboration in reducing unnecessary antibiotic use—improving both individual patient outcomes and global public health.

Findings

A very low percentage of infectious complications has been linked to an approach based on improving patients' dental hygiene practices and clean surgical procedures in a clean environment. This evidence suggests that prescribing systemic perioperative antibiotics in dentistry should be considered unnecessary and potentially harmful.

Interpretation

Modified biofilm gained through good oral habits is a safer prophylactic approach both for the patient and the whole population if compared with systemic antibiotic prophylactic administration.

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