Mandibular Subperiosteal vs Loco-regional anesthesia for implant placement - preliminary report from randomized clinical control trial

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Abstract

Introduction –Many authors defend that loco-regional anesthesia is superior to all other techniques for posterior mandible implant placement. Due to articaine liposolubility (potency) properties, evidence suggest that sub-periosteal administration only is enough. However there is no scientific validation to support either claim.

AIM – The aim of this ongoing double blinded randomized clinical trial is to compare efficiency and morbidity of the loco-regional with sub-periosteal anesthetic technique, for implant placement in the posterior mandible.

Materials and methods: A comparison study will be performed between two homogeneous groups, with an experimental group (sub-periosteal anesthesia) and a control group (loco-regional anesthesia). 1.8ml cartridge Articaine hydrochloride at 4% with epinephrine at 1:100.000 will be administered to both groups. If, needed, during surgery, anesthetic reinforcement will be provided using the technique that the surgeon feels best, independently of the study group.

All data will be collected at the day of the surgery. The study was approved by the FMDUL (University of Lisbon, School of Dentistry) ethical committee

Results – 50 patients successfully completed the trial. In 25 implants loco-regional anesthesia was used 25 and 25 implants were placed under sub-periosteal anesthesia. The average surgical time was 42 minutes, ranging from 23-76 min. The average number of cartridges used for every surgery was two (loco-regional or sub-periosteal). 100% of patients of the study considered the technique administered as effective. Post-operative pain was low for each group, and no complications were detected on any patient.

Conclusions – From this preliminary sample, the results suggest that the level of anesthesia achieved in both groups was the same. Given the preliminary results, no difference seems to exist between both techniques, so the sub periosteal anesthesia could be considered a safe technic.

Background and Aim

In the literature two basic types of anesthetic technique are described: loco-regional anesthesia and subperiosteal anesthesia (Donohue 1993). The technique of anesthesia varies with some schools and the literature. Some advocate the use of loco-regional anesthesia and others advocate the use of only infiltrative (buccal and lingual) anesthesia.

Many authors state that locoregional anesthesia is superior to all others. Others state that with the evolution of articaine, subperiosteal injection is sufficient for implant placement (Stabile 2000). Articaine has high penetration rate and tissue diffusion due to the presence of the thiophene ring, which gives it a greater liposolubility. Its plasma binding is 60% to 80% (Barlett,2016), similar to other anesthetics of the amide group.

The absence of a clinical recommendation on the type of anesthesia appropriate to the type of intervention motivates the accomplishment of this study.

AIM- The aim of this ongoing double blinded randomized clinical trial is to compare efficiency and morbidity of the loco-regional with sub-periosteal anesthetic technique, for implant placement in the posterior mandible

Methods and Materials

This study was approved by the FMDUL (University of Lisbon, School of Dentistry) ethical committee. Informed consent was signed by all patients included in this study.

A comparison study was performed between two homogeneous groups, with an experimental group (sub-periosteal anesthesia) and a control group (loco-regional anesthesia).

In the control group, first a 1.8ml cartridge Articaine hydrochloride with 4% with epinephrine at 1:100.000 (Inibsa Laboratories, Spain) was administered. Then another cartridge of anesthesia was administered buccally to the area of implant placement. In the test group, one and a half cartridges of 1.8ml cartridge Articaine hydrochloride with 4% with epinephrine at 1:100.000 was administered buccally to the area of implant placement and half of a cartridge was administrated lingually.

During surgery, in both groups and if needed, an anesthetic reinforcement was provided using the technique that the surgeon felt most appropriate independently of the study group.

All the data regarding reinforcement of anesthesia were recorded. The level of pain during anesthesia, during surgery and after surgery was quantified using a Visual Analog Scale for Pain Perception (VAS) and using the following questions:

Question 1 - Mark the amount of pain you feel right now (before surgery)

Question 2 - Check the amount of pain you felt when being anesthetized

Question 3 - Check the amount of what you felt during the intervention

Question 4 - Mark the amount of pain you feel right now (after surgery).

Other data like time of surgery and age of the patient were also recorded.

Fig. 1 – Locoregional technic

Fig 2 – Subperiosteal technic

Results

The calculated sample for this research was 100. 50 patients completed the study so far: 25 patients in the loco regional group and 25 patients in the subperiostal group. The results of this preliminary study are presented in Table 1.

The statistical analysis was performed using T-test: two samples assuming equivalent variances between groups. The variables compared were: age, time of surgery (minutes), amount of anesthetic (mg), amount of vasoconstrictor (mg),number of cartridges and the questions of the survey. p <0.05 was considered significant.

Variable	T-student test result
Age	0,37
Time of Surgery (minutes)	0,43
Amont of Anesthetic (mg)	0,03
Amont of Vasoconstrictor (mg)	0,02
Number of Cartridges	0,03
Question 1	0,38
Question 2	0,38
Question 3	0,39
Question 4	0,41

The amount of anesthetic, the amount of vasoconstrictor and the number of cartridges showed significant differences. The other parameters showed no difference.

Conclusion

The preliminary results of this study suggest that when comparing loco-regional anesthesia versus subperiostal anesthesia for implant placement in the posterior mandible there is no difference between both groups. However, amount of anesthetic, the amount of vasoconstrictor and the number of cartridges showed significant differences between groups, which may indicate subperiosteal anesthesia as safer. These are preliminary results that should be analyzed with caution.

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