



**PREVENTION OF INTRAVASCULAR INJECTION OF  
ANESTHETIC DURING INFERIOR ALVEOLAR NERVE BLOCK**

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**Objective:** *The aim of this study was to improve the safety of local injectable anesthesia in oral surgery of the mandibular region by implementing and standardizing aspiration testing and optimizing the design features of carpule syringes.*

**Materials and Methods:**

The study included 200 patients (aged 25–75 years) undergoing mandibular tooth extraction under local anesthesia in an outpatient setting. Four classical techniques of mandibular anesthesia were used: conventional inferior alveolar nerve block (palpation-guided), torus anesthesia, Gow-Gates mandibular nerve block, and the Vazirani–Akinosi closed-mouth technique.

Aspiration testing was performed using carpule syringes with different plunger designs: “harpoon,” “corkscrew,” and “arrow” (simple plunger). Anesthetic cartridges with and without a retention notch were used.

Cardiovascular monitoring was performed using a pulse oximeter (Armed YX 300), recording heart rate before, during, and after injection. Positive aspiration was defined as the presence of blood in the cartridge.

**Results:**

The design of the syringe significantly influenced aspiration reliability. Harpoon and corkscrew plungers with retention-notch cartridges provided better negative pressure and higher detection rates. Arrow plungers showed lower reliability.



Positive aspiration rates:

- Torus anesthesia — 18.2%
- Conventional mandibular — intermediate values
- Gow-Gates — 5.1%
- Vazirani–Akinosi — 4.56%

Repositioning the needle by 3–5 mm after positive aspiration effectively prevented intravascular injection in most cases.

Clinical signs of intravascular injection were observed in 0.27% of patients. False-negative aspiration results were also identified.

Conclusions:

Aspiration testing remains essential for preventing intravascular injection. The most reliable tools are syringes with harpoon or corkscrew plungers and cartridges with retention notches. Torus anesthesia carries the highest risk of intravascular injection compared to other techniques.