

is appropriate implant placement. There have been dramatic advancements in technology used to plan and accurately place implants since Brånemark in 1982, including cone-beam tomography, digital design and implant planning, and the ability to print highly accurate guides for implant placement. Dynamic navigation (DN) is a burgeoning technology in implant planning and placement that warrants study of its accuracy.

Objective

The goal of this study was to test a commercially available DN system for accuracy of implant placement compared to a fully limiting static guide (FG) and conventional implant placement using an out-of-bounds guide (OG).

Materials and Methods

A master mandibular model had six implants placed (Figure 1A). These implants were used to plan the experimental implant locations using cone-beam tomography (CBCT) in X-Guide (X-Nav, LLC; Figure 2) and Blue Sky Plan (Blue Sky Bio, LLC; Figure 3) for DN and FG, respectively.



Figure 1: A - Master model with DN attachment, B - Printed FG, C - Acrylic OG.

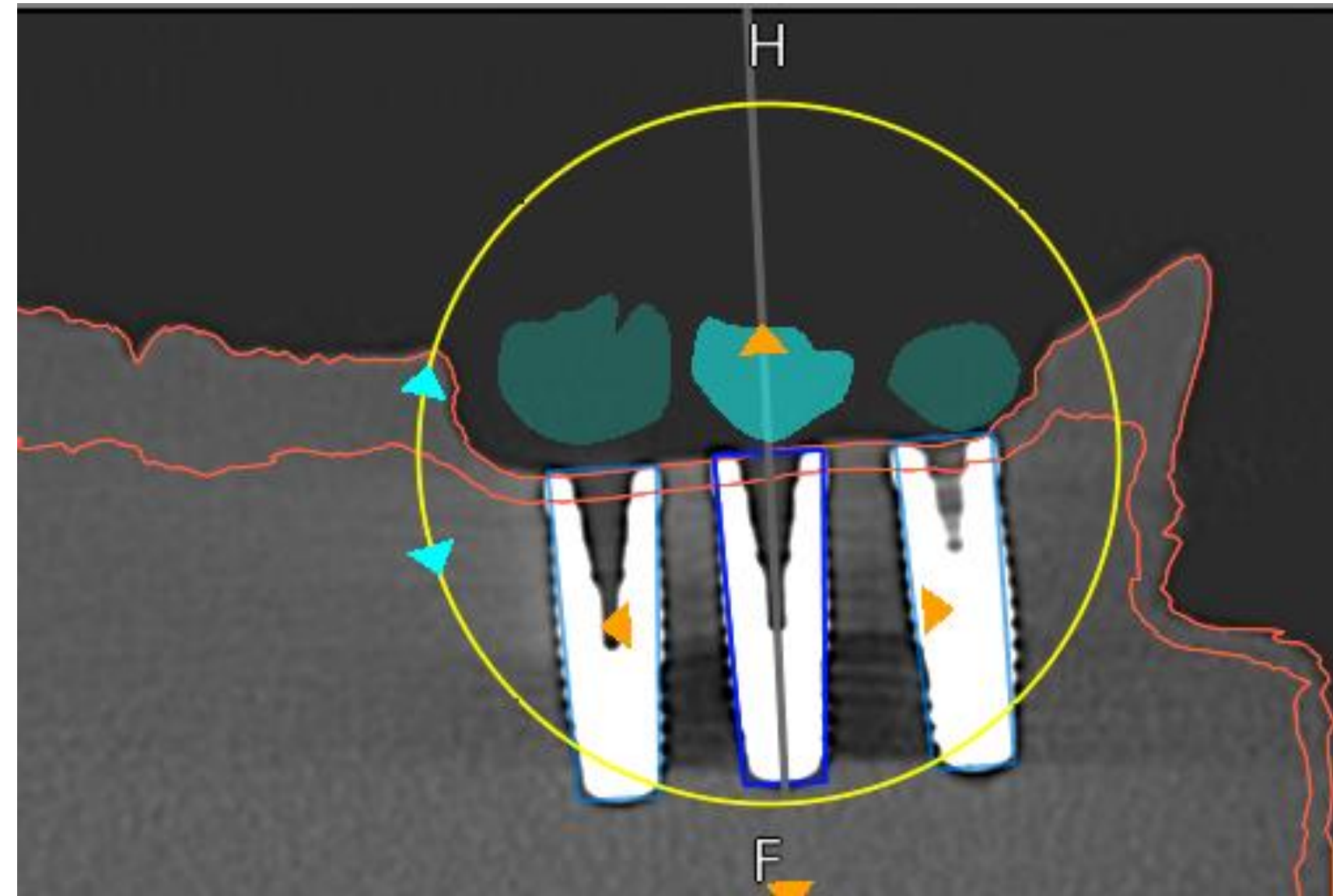
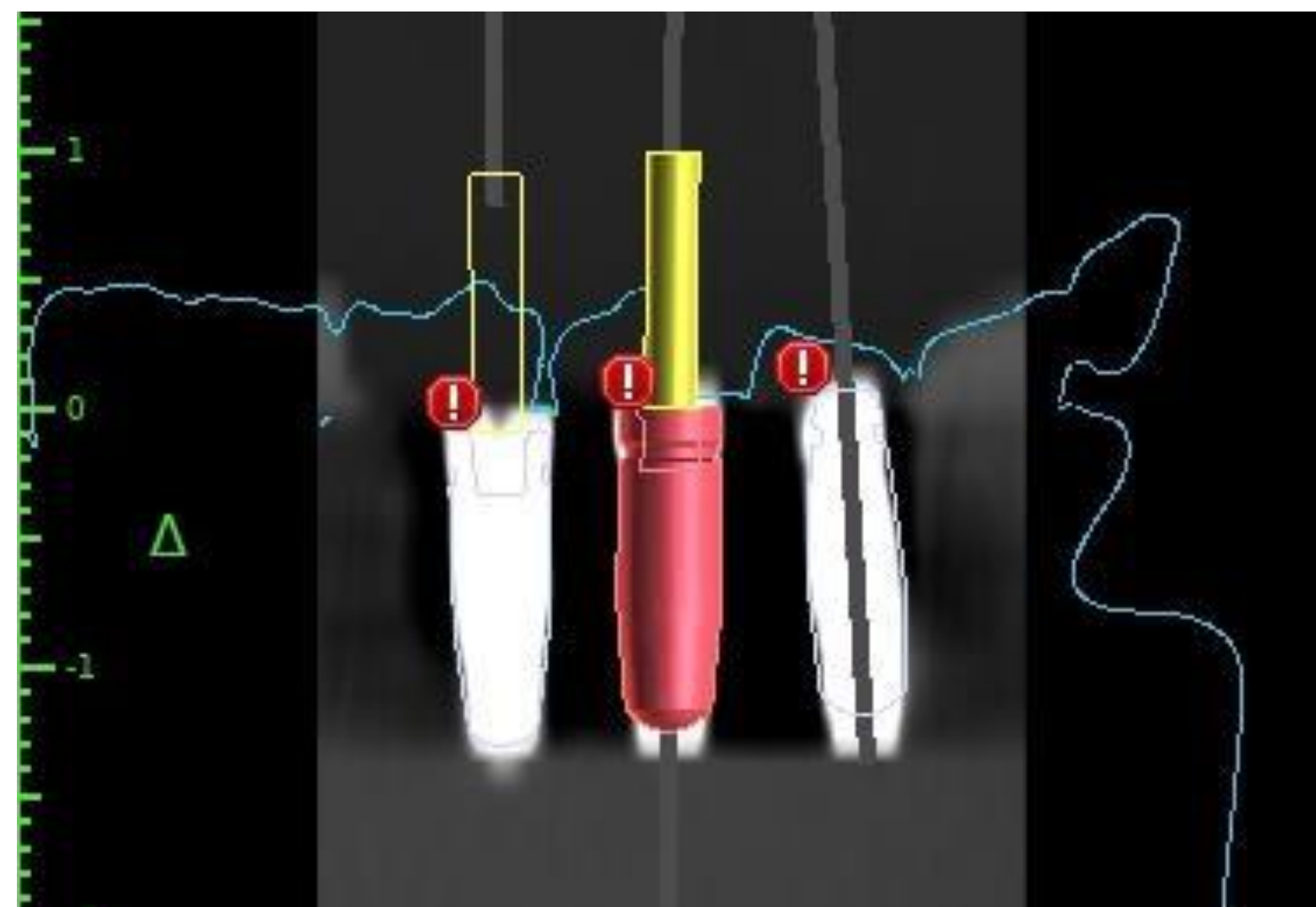


Figure 2: X-Guide implant planning.



Figures 3: Blue Sky Plan implant planning.

Modality	Total Angular Error (°)	Total Error at Entry (mm)	Total Error at Apex (mm)
OG	4.39 ± 2.11	0.84 ± 0.34	1.21 ± 0.55
FG	2.00 ± 1.08	0.46 ± 0.34	0.80 ± 0.33
DN	1.27 ± 0.63	0.66 ± 0.32	0.67 ± 0.43

Table: Average error and standard deviation

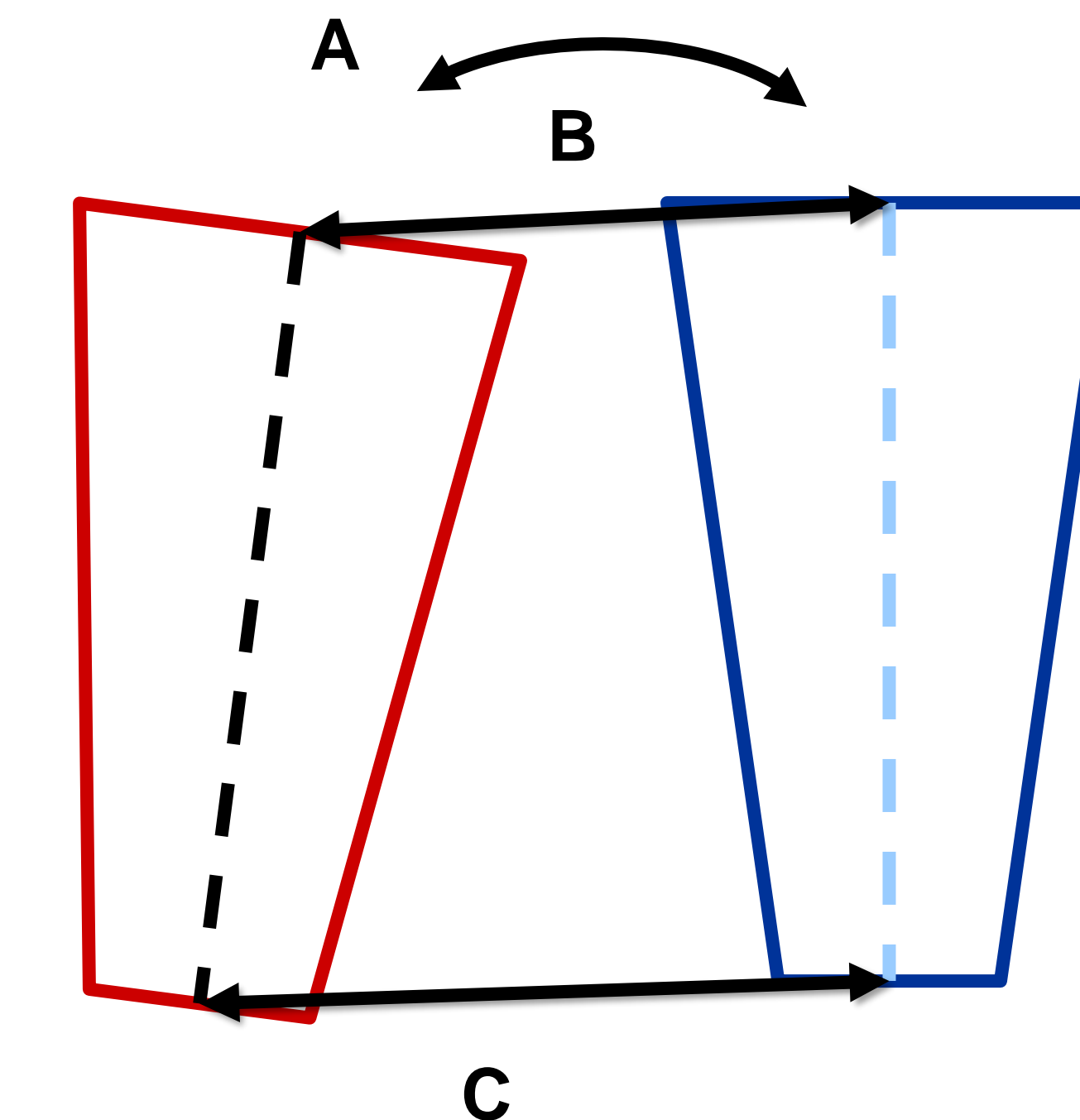


Figure 4: A. angle deviation, B. entry point deviation, C. apex deviation.