Mini Screws Meeting Technology: Digital Guidance and 3D Applications

Özge Sözen

DDS, PhD Student of Orthodontics, İzmir Katip Çelebi University, Faculty of Dentistry, Department of Orthodontics, İzmir-Türkiye

Bersan Karadede *

DDS, PhD of Orthodontics, Assistant. Professor, Department of Plastic and Reconstructive Surgery, Yalova University, Yalova, Turkey

Rafael Ecija Navarro

Orthodontist, Sleep Unit Department, Central Military University Hospital “Gomez Ulla,” Madrid, Spain

Abstract:

The use of miniscrews in orthodontics has become increasingly important, offering improved anchorage and control in complex treatments. Recent advances in digital technology have significantly improved the precision and success of miniscrew placement. Additionally, digital and 3D applications facilitate better communication between orthodontists and patients by providing clear visualizations of the treatment plan.

Computer-aided digital planning and guidance systems allow for preoperative simulations, enabling clinicians to determine the optimal positioning of miniscrews based on each patient's anatomy. As a result, digital guidance improves treatment success by reducing risks such as root damage or anchorage failure. The integration of these technologies has also led to improved patient comfort, as procedures are now less invasive and more precisely targeted.

3D technologies, especially 3D imaging systems and 3D modelling, have further expanded miniscrew applications. Precise anatomical data from 3D imaging allows for detailed treatment planning, while custom 3D models help ensure correct screw placement as a guide. This approach minimises the risk of complications and shortens intervention times. These innovations not only streamline clinical workflows but also support more sustainable practices by reducing the need for multiple adjustments or revisions during treatment.

Combining digital guidance and 3D technology offers advantages such as improved precision, shorter procedures, and higher treatment success. This presentation aims to highlight the transformative impact of digital guidance and 3D applications in orthodontic practice, emphasizing their potential to shape the future of patient-specific orthodontic treatment.