



Comparison of a newly developed method Digital TMR with conventional TMR based on glass plates

E. de Josselin de Jong^{ab}*, G.N. Komarov^b, E.J. Miles^b, S.M. Higham^b



UNIVERSITY OF
LIVERPOOL

^a Inspektor Research Systems BV, Amsterdam, The Netherlands

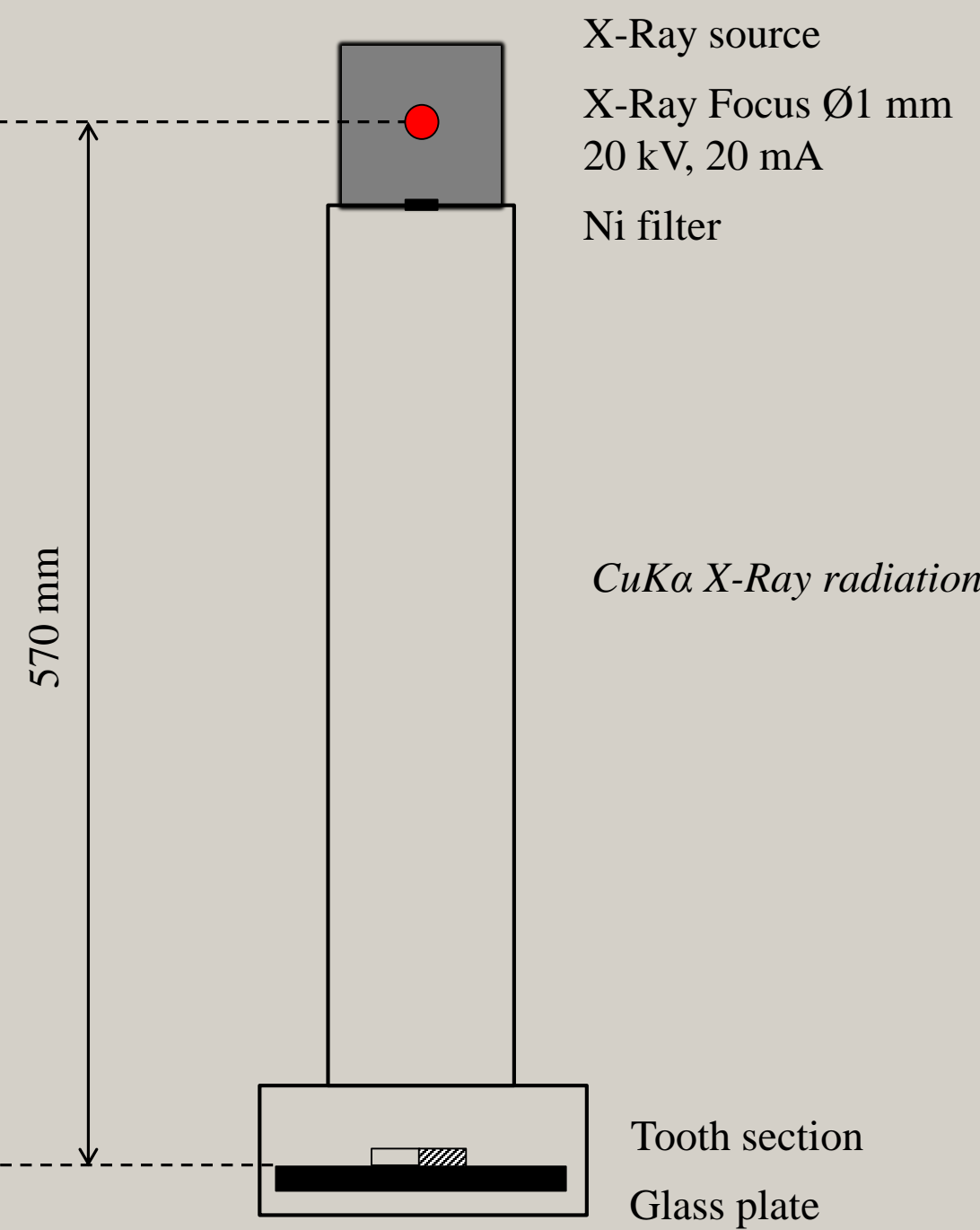
^b Health Services Research & School of Dentistry, University of Liverpool, Liverpool, UK

Aim

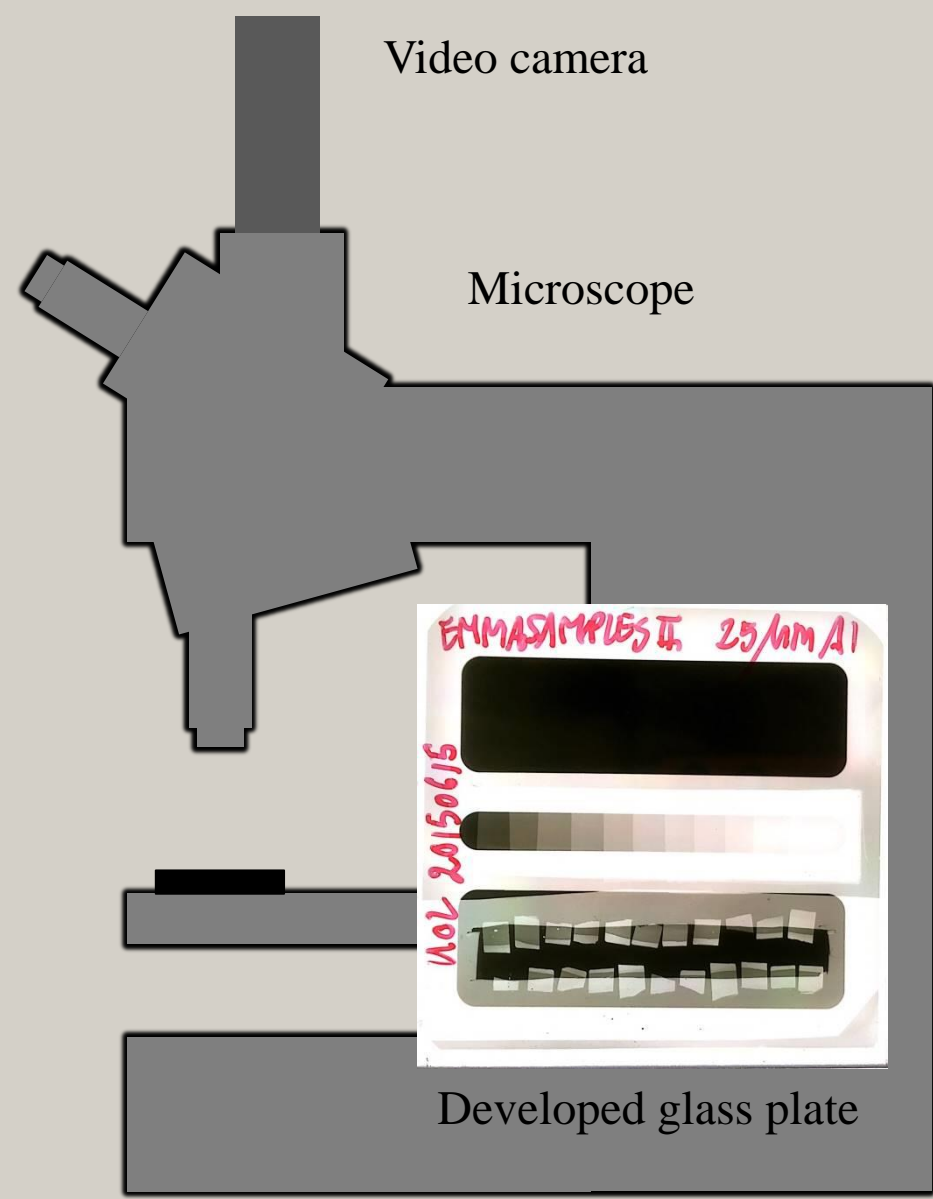
Transverse Micro Radiography (TMR) is the gold standard method to quantitatively assess the mineral profile. The aim was to compare a new method (TMRD) with the standard TMR with respect to Integrated Mineral Loss (IML) and Lesion Depth (LD)

Method

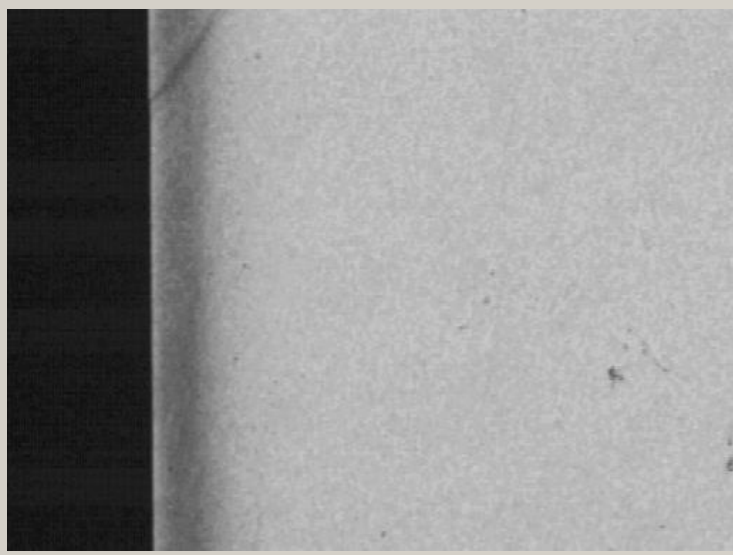
TMR, Contact Microradiography



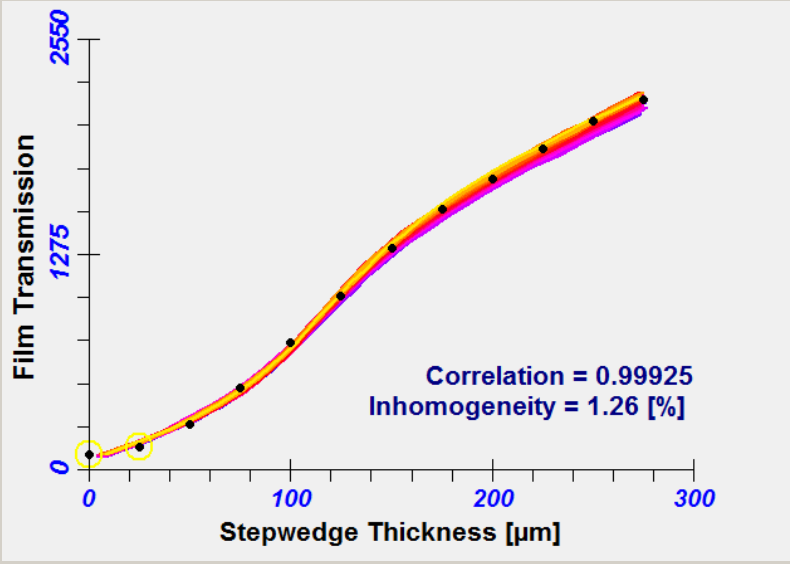
TMR, Glass plate scan



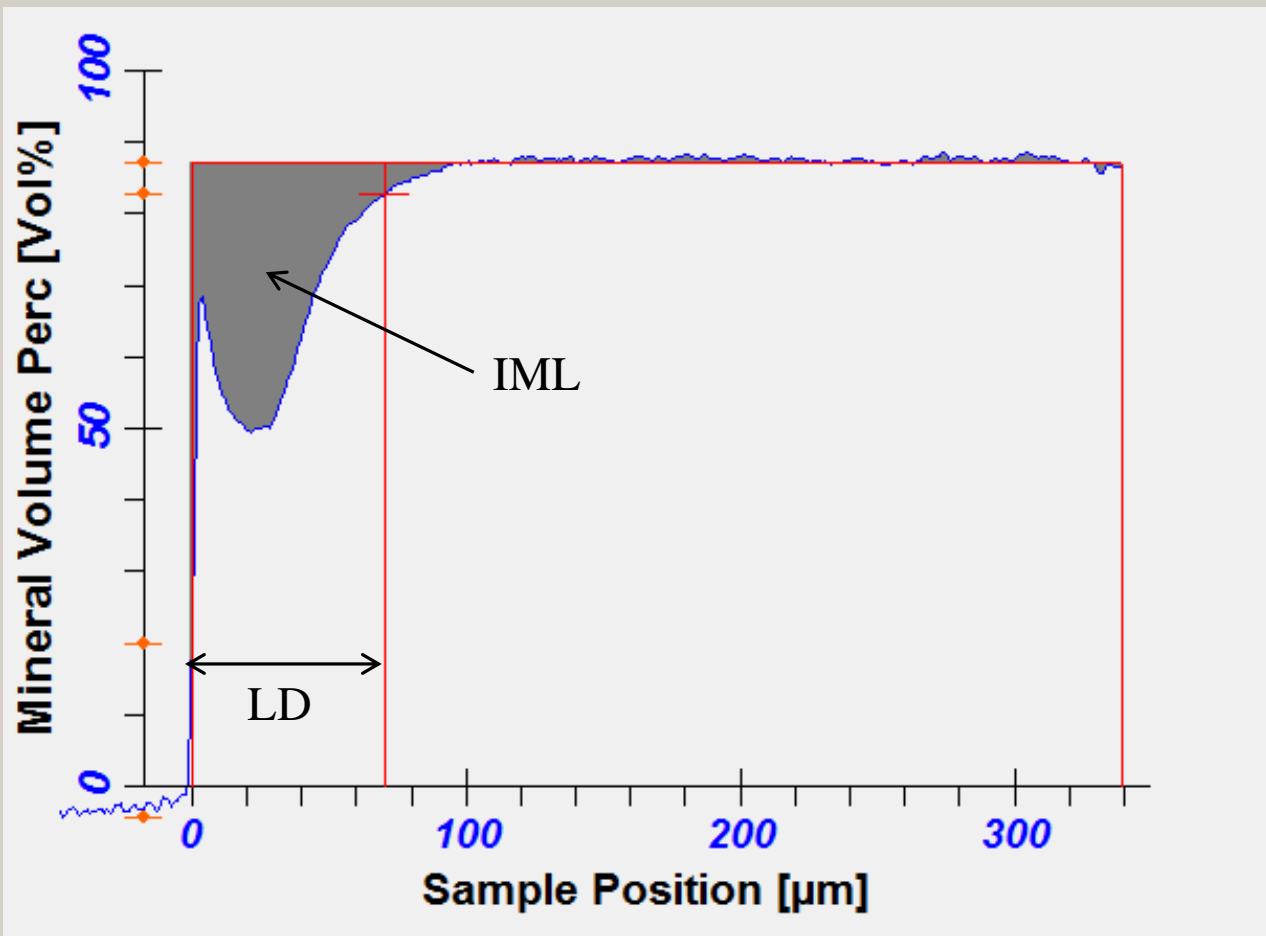
TMR, section image in PC



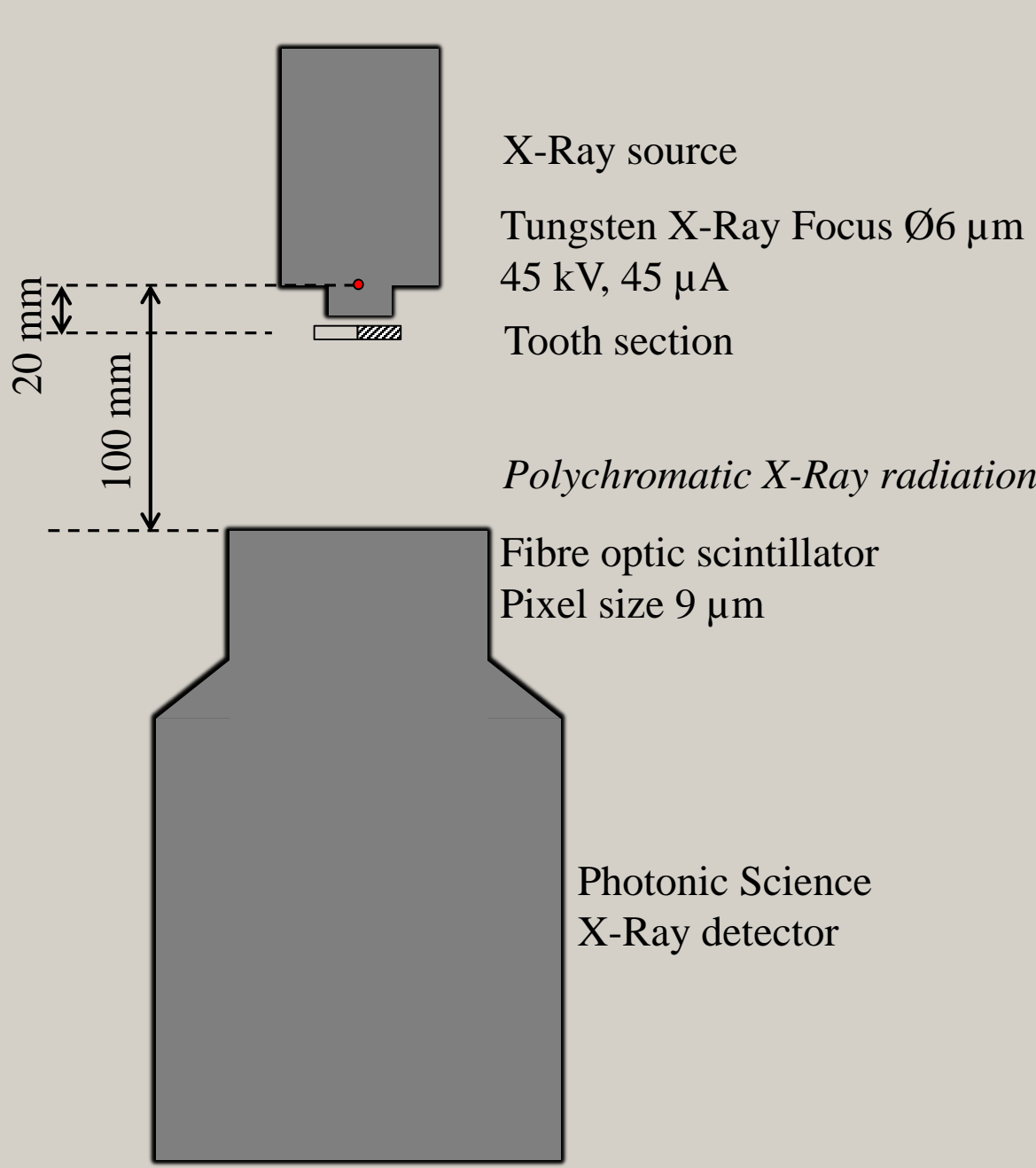
TMR, Step wedge curve



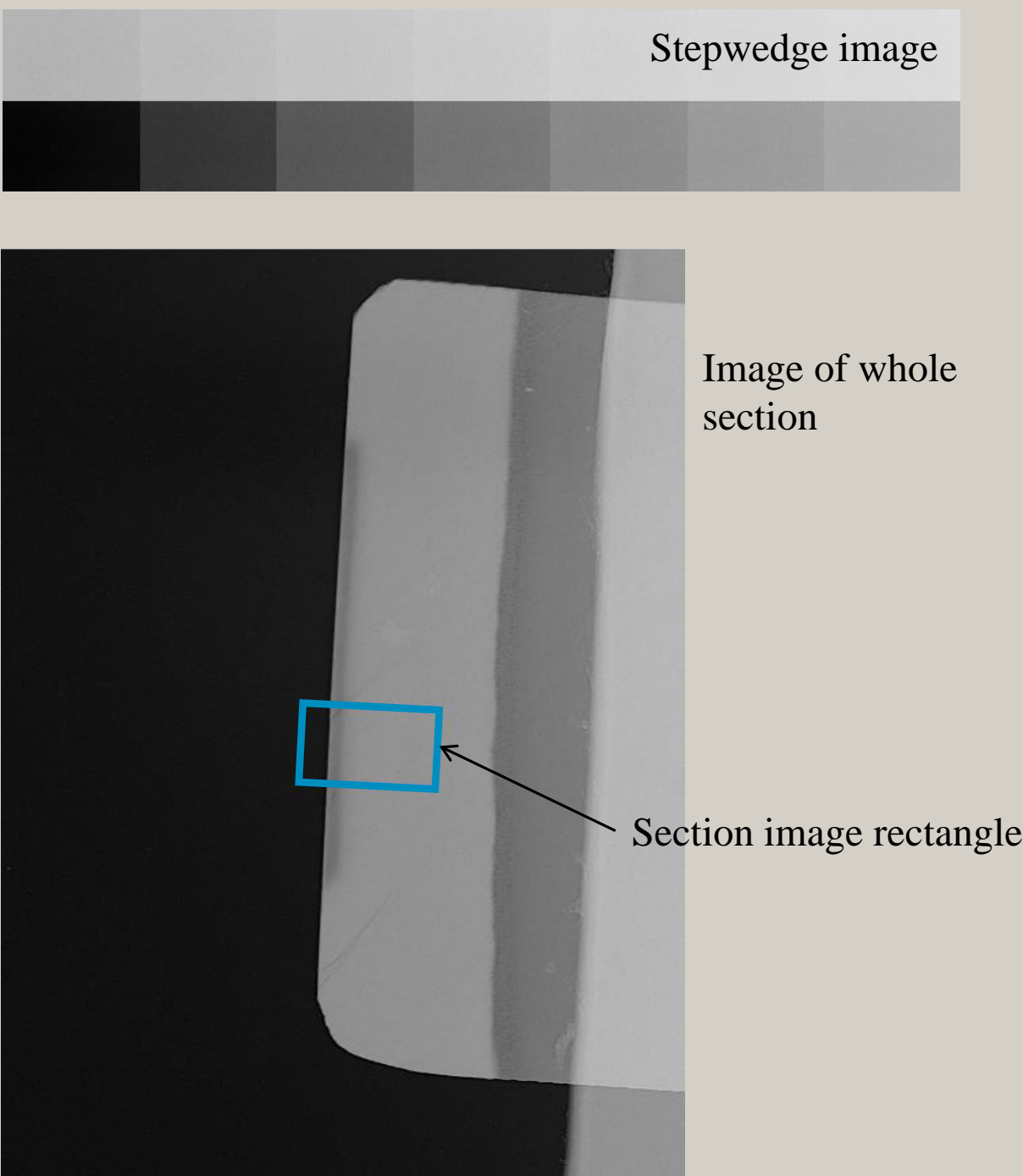
TMR, Volume% profile



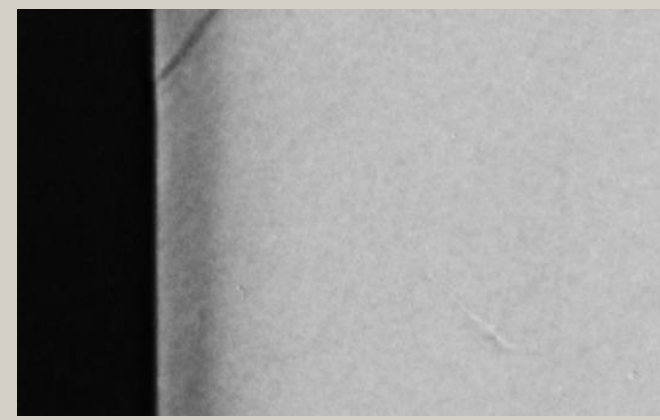
TMRD, Digital Microradiography



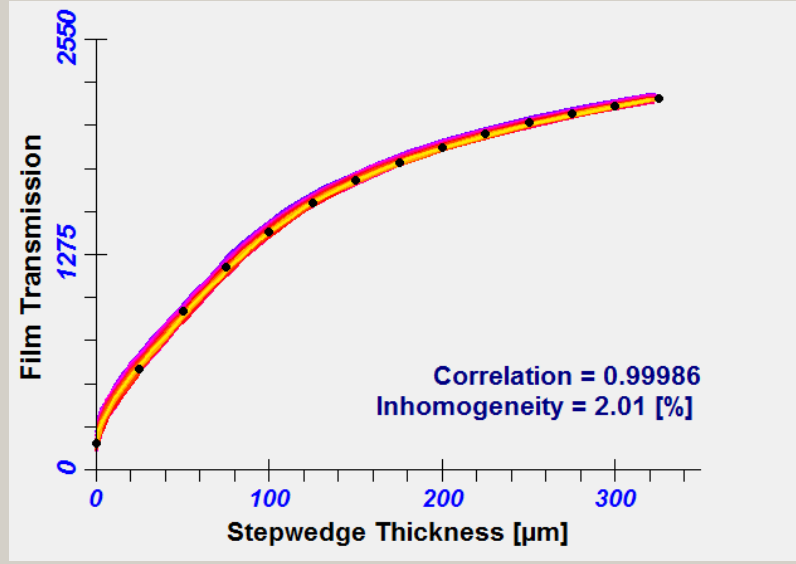
TMRD, Direct image capture in PC



TMRD, section image in PC



TMRD, Step wedge curve



TMRD, Volume% profile

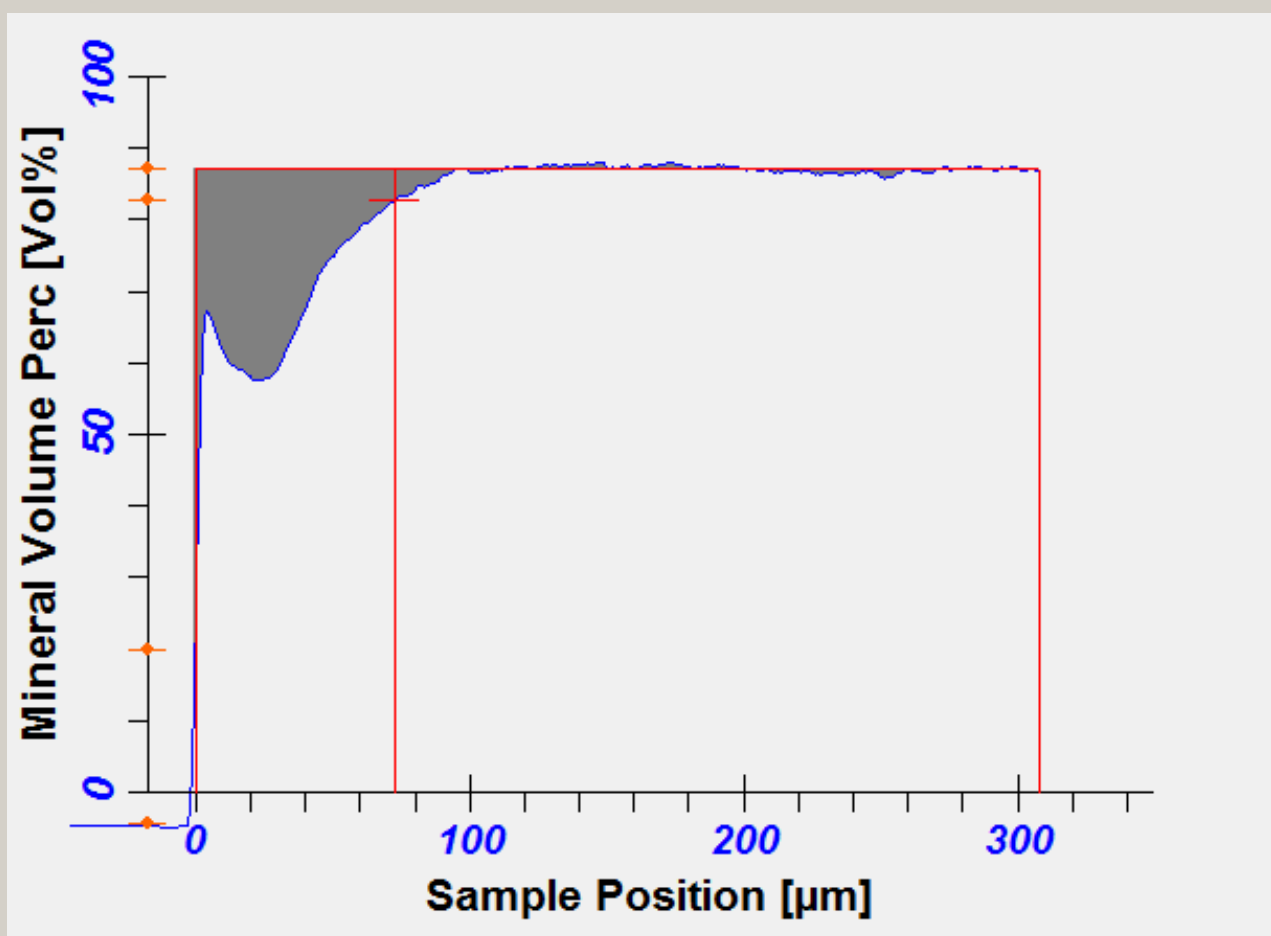


Figure 1. Method description of TMR and TMRD

Materials

Artificial caries lesions were created using a demineralising acid solution on the flattened surface of six extracted bovine incisors. With both methods microradiographic images were made and the sections were scanned at three positions with the same analysis software TMR 2006 (3.0.0.19)



Figure 2. Tooth sections on flexible plastic holder

Results

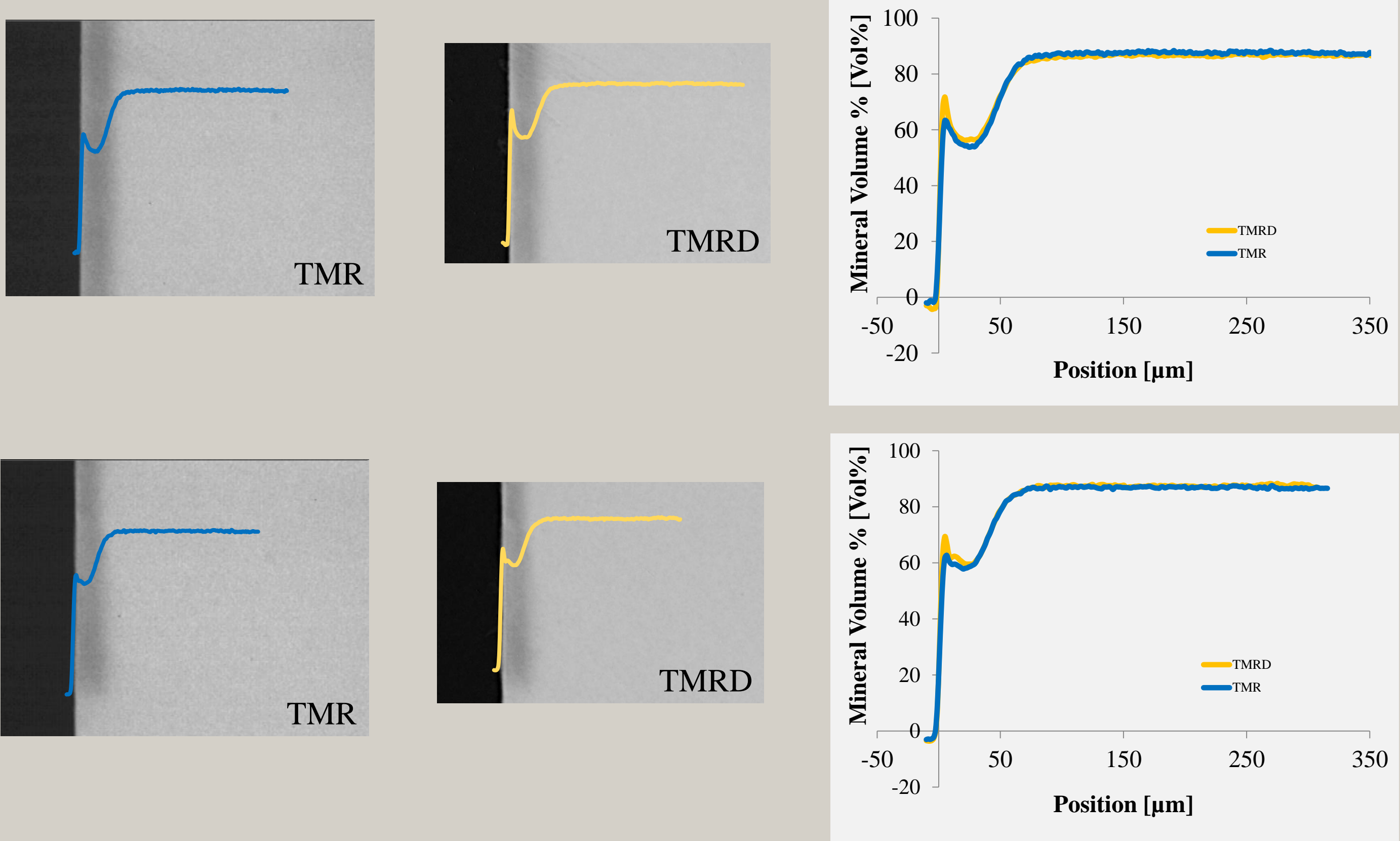


Figure 3. Comparison of X-Ray images and mineral profiles of TMR and TMRD

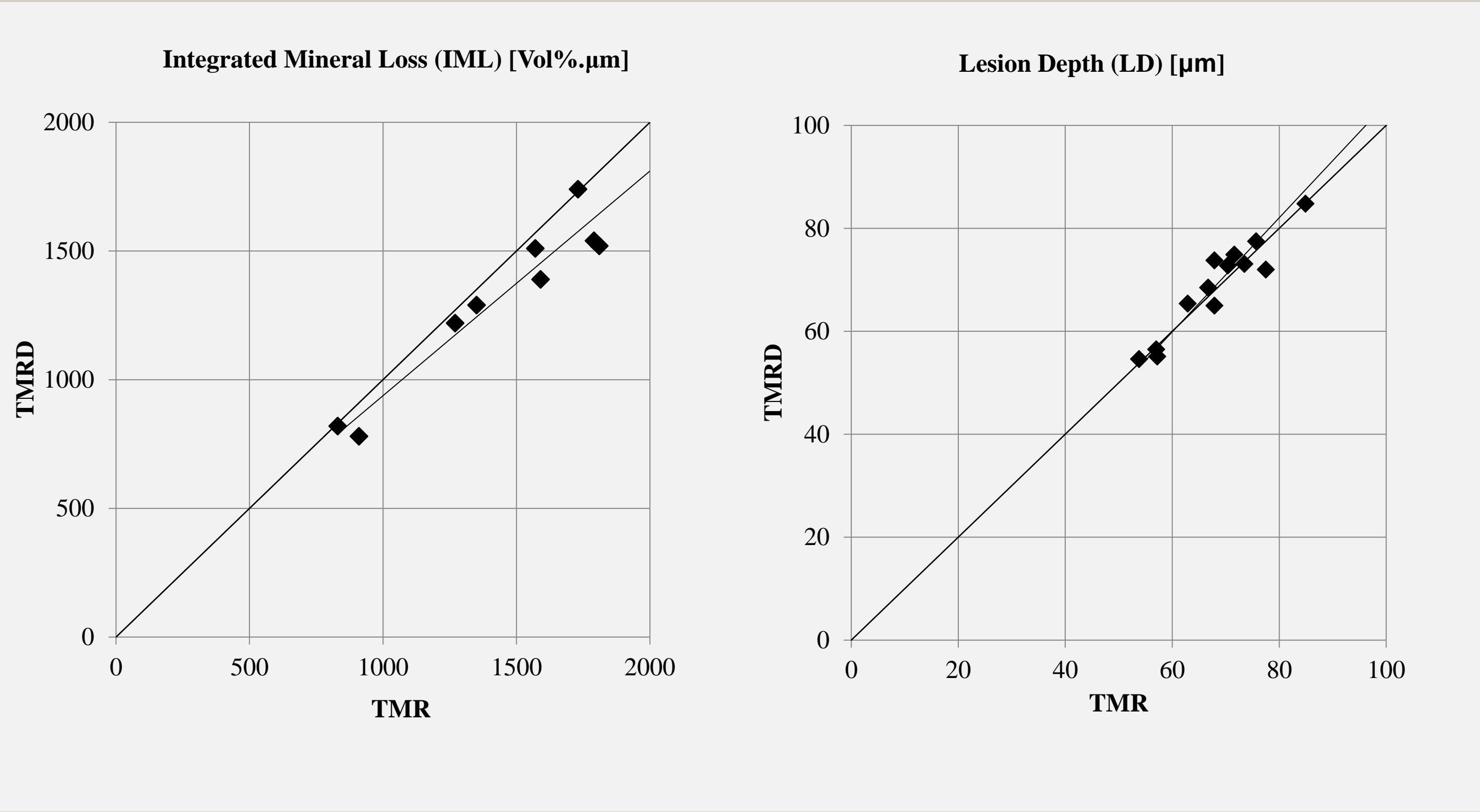


Figure 4. IML comparison

Figure 5. LD comparison

Results

For TMR IML was 1760μmVol% (SD 554μmVol%) and for TMRD IML was 1601μmVol% (SD 497μmVol%), respectively. LD was 71μm (SD 15μm) for TMR and 73μm (SD 17μm) for TMRD. Correlation was found for IML ($r^2=0.95$) and LD ($r^2=0.95$).

Conclusion

Digital TMR seems a promising alternative for classical TMR