One-week diary of the use of the X-Mind trium CBCT unit in practice

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There is mounting evidence in the literature of the diagnostic superiority of 3-D imaging versus 2-D. As a result, many clinicians today are using 3-D imaging either by referring their patients to a CBCT scanning centre or having mobile units visit them—the only benefit of this is that there is no initial capital outlay to buy the machine. In contrast, the benefits of an in-house CBCT device are many, including the convenience of an on-demand service at any time (pre, peri or postoperatively if needed), learning one software programme and utilising it fully, rather than having to learn different ones for different machines from various manufacturers and thus not employing it to its full potential. Additionally, patients appreciate the convenience of not having to travel to another location.

Our X-Mind trium CBCT unit from ACTEON is rather new to our practice, and we have yet to fully utilise it. Every day we find new uses and ways to benefit our patients by using 3-D imaging when applicable. Following the latest evidence from experts in the utilisation of 3-D imaging, we can help a great deal in deciding where and when to use it, consequently minimising radiation dosage and improving diagnostics and planning.

We owe our patients the lowest possible dose with the corresponding acceptable diagnostic value, and sometimes, a 2-D image does not provide satisfactory diagnostic value. A great deal of guesswork is often involved with 2-D imaging and exposing the patient to extra radiation. In many cases, a small FOV that is enough for one to several teeth could be equal to the radiation dose of several periapical radiographs, but with a much higher diagnostic value.

When a 3-D image is necessary, patients appreciate the information and education they obtain by the case being discussed with them while pointing out vital structures and proposed solutions in 3-D compared with a 2-D image that generally does not make sense to the untrained eye.

In order to show how a CBCT unit can affect day-to-day dentistry in a small family practice, it would be beneficial to share a week’s diary of its use. This article provides a small selection from a week’s diary regarding the use of the X-Mind trium CBCT unit in the clinic. More CBCT scans were often obtained on any one day depending on the cases on that day; however, owing to space limitations in this article, only one to two cases per day are described. It must be borne in mind that each patient’s needs are different, but one thing should be common above all and that is to assess every case individually and never take 3-D scans routinely, despite their clear diagnostic benefits.

Day 1

The patient had had all of his mandibular teeth extracted many months before, owing to mobility and infections, and preferred to have a fixed solution through implant therapy. At that point, the patient was wearing a well-fitted temporary mandibular denture. Initially, the idea was to take a scan of the existing denture with radiopaque markers (gutta-percha in six to eight holes made in the denture) to plan for the placement stage. However, a decision was made to duplicate the existing denture using a duplication wax (Lang

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Dental) in order to fabricate a clear acrylic radiographic guide (Figs. 1 & 2).

A 3D scan was obtained using the X-Mind tri trium CBCT scanner to be utilized in the treatment plan ning of the case, and we found it to be an invaluable resource. Through the scan, the type and position of the implants in relation to the den sity of the surrounding bone were checked. The ACTEON Imaging Suite software that comes with the device includes a library of the most current implants on the mar ket, allowing placement of the right implant with the right angulation, plus abutments and crowns, in or der to maximise the predictability of positioning the implants, thus improving the treatment success. For clinicians who use more than one implant system, in order to change the implant model that was inserted from the library, one sim ply clicks in the middle of the im plant and the implant library is opened again, allowing the selec tion of another implant model. The software will retain the same with inser tion point and direction of the pre vious one.

In addition, the software evalu ates the bone density around the implant. The aim is to show, both through colour maps and numerically (Figs. 3 & 4), the values before commencing surgery (green if the values are acceptable or high and red if the values are low) (Fig. 5), al lowing the clinician to make the right decision. This can also be a very good educational tool to show the patient the bone density around any potential implant. In our expe rience, patients like this feature once shown what it means.

Day 2
An implant was planned to re place the missing mandibular molar, and the position of the mandibular canal was not very clear on a 2D image, the position was still a little confusing. For this case, we decided to use the ACTEON Imaging Suite’s FlyModel option, which is like a virtual endo scope that follows the mandibular canal tract from within and clas sifies the path to confirm that our nerve tracking is correct (Fig. 6).

This is one of the unique features of the software.

Day 3
Obtaining the correct position and trajectory of a retained maxi lary canine has conventionally been dealt with by taking 2D im ages (periapical radiography) at dif ferent angles and possibly an occl usal film to determine the correct po sition in the buccal papal aspect, together with some guesswork. 3D imaging can be an invaluable tool for this indication. The patient re fused orthodontic extrusion of the maxillary left canine and wanted both the primary and permanent canines extracted and replaced.

“ We know that 3-D imaging is here to stay.”

The bone density was checked at the site (Fig. 13), and the re sults indicated that a wider implant would possibly be a better choice to improve integration, rather than the one chosen from the implant li brary. This would also allow us to decide on perhaps performing an under preparation of the osteotomy site in order for the implant to en gage the bone better. This obviously depends on the type of implant used and other factors with which the expert clinician will be familiar.

Day 5
This case was performed by another clinician, who was hoping to achieve good integration after plac ing two anterior implants with grafting material. According to the clinician, primary stability was good at the time of placement and the implants were placed in bone with some buccal fenestrations, hence the grafting. It thus ap peared that the grafting in the mesial was indicated. After the patient complained about some threads showing through the soft tissue, the clinician suggested further grafting to secure the im plants. A CBCT scan was obtained (Fig. 14) as part of the case plan ning them their clinical conditions and perhaps the limitations (ana tomical, structural, etc.), together with other factors that may affect treatment planning and outcome, hopefully for the better. We hope to use our CBCT scanner for more indications, especially in endodontics, as we have seen amaz ingly positive results from using a CBCT scan in some difficult endodontic cases we acquired this 3-D technology. It is the way forward, and we wish we had the X-Mind tri trium scanner.

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