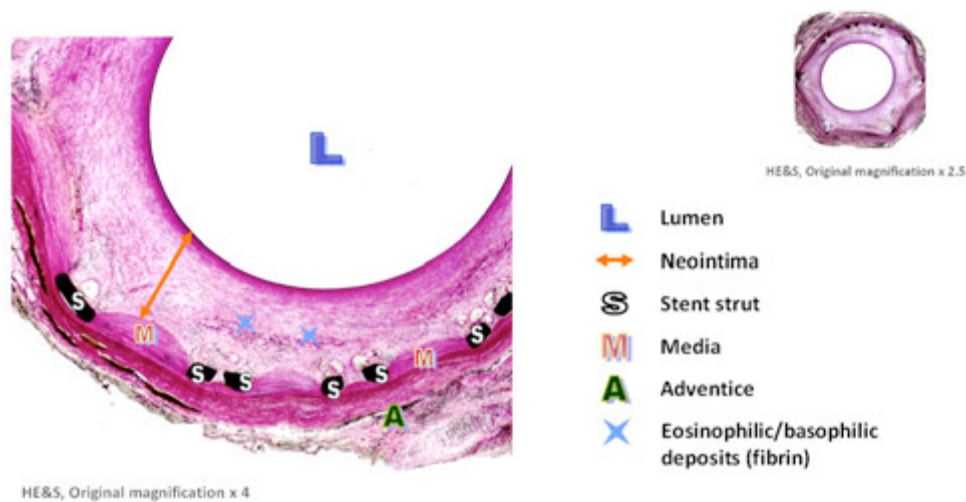




IMMR Accelerating your innovative research

## Histologic preparation of hard tissue : Medical devices in tissue explants



“Histopathology is the final and corner-stone assessment of all the medical devices tested at IMMR. Safety issues have indeed to be addressed at a microscopic level in a standardized and scrupulous manner. But histologic preparation of hard tissue specimens is not as routine as paraffin embedding. Teeth, bone, dental implants, coronary or aortic stents, screws, medical ceramic require that the tissue preparation be respectful of both the implant and the host tissue. The cutting and grinding technique is the gold standard in order to obtain thin sections of large specimens which cannot be processed by conventional techniques.”

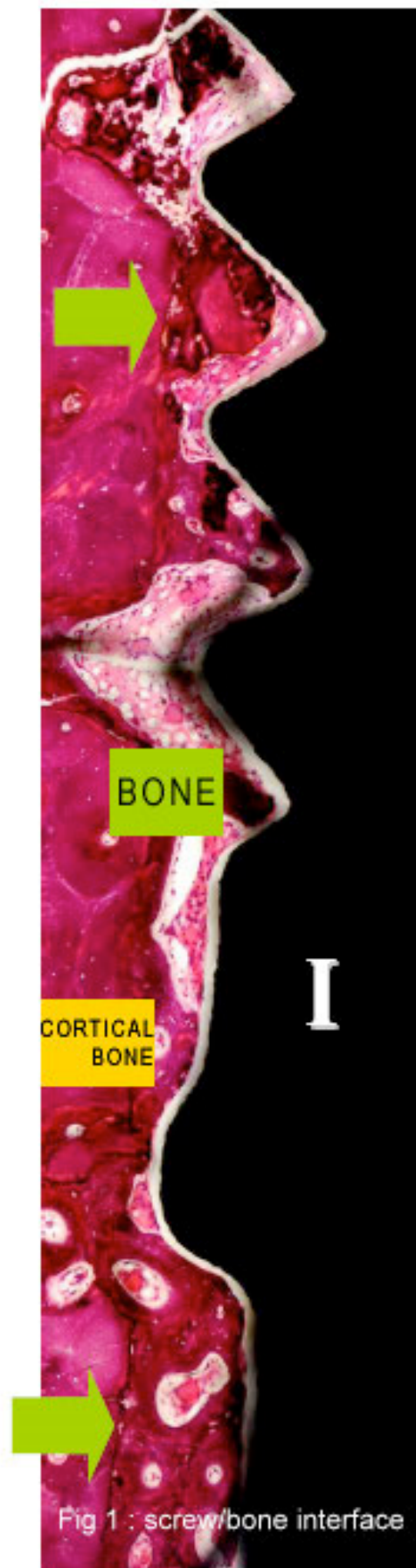
**Dr Nicolas Borenstein, DVM, PhD**  
Scientific and technical manager  
IMMR

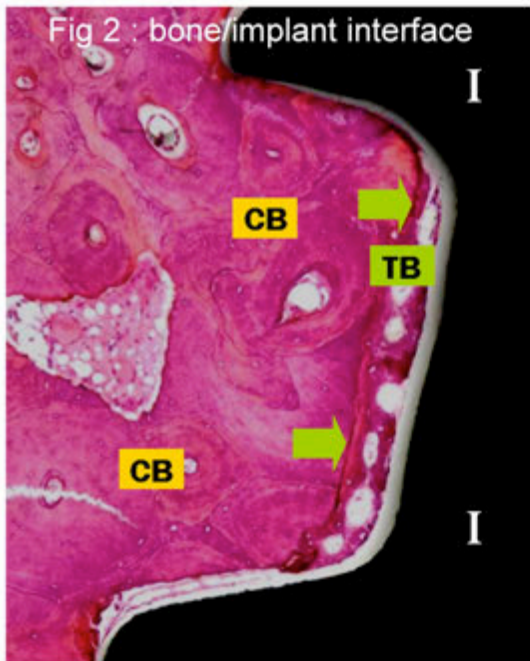
**A**fter high definition non destructive assessment with X-ray (Faxitron, see previous newsletter) our workflow includes the embedding of tissue in a plastic resin, cutting and grinding such that we obtain thin sections fit for staining and reading under light microscopy.

**H**ere is a more detailed outline of the process:

- Immersion or perfusion fixation (formalin)
- Pre-cutting with the saw band (optional) only when specimens cannot be embedded fully because of excessive size (long bones, etc.)
- Dehydration (increasing alcohol concentration under agitation and vacuum)
- Plastic infiltration with Technovit (a light sensitive methacrylate polymer)
- Embedding and polymerization with a 450-nm light
- Preparation of the block to obtain 2 parallel surfaces with preliminary grinding
- Affixation of a parallel slide onto the block
- Preparation of the separation cut by using the cutting-grinding system where a slice will be prepared in the tissue specimen sandwiched between the two slides
- Final grinding until the desired thickness is obtained
- Staining of slides
- Cover-slipping of slides

The following stains can be applied to the obtained slides : HE&S, Toluidine Blue, PAS, Masson Trichrome, Gomori, Giemsa, Movat, Van Gieson, and several others.

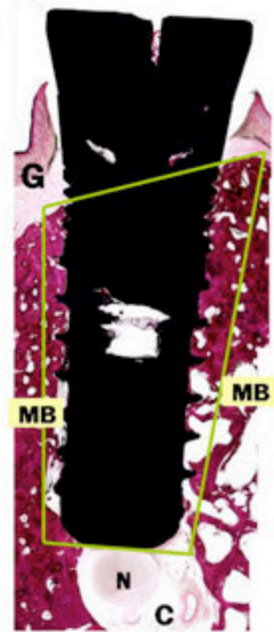




H&E, x 10

Fig 3 : dental implant

- G Gum
- I Implant
- MB Mandibular bone
- C Medullary cavity
- N Nerve



H&E, x 20

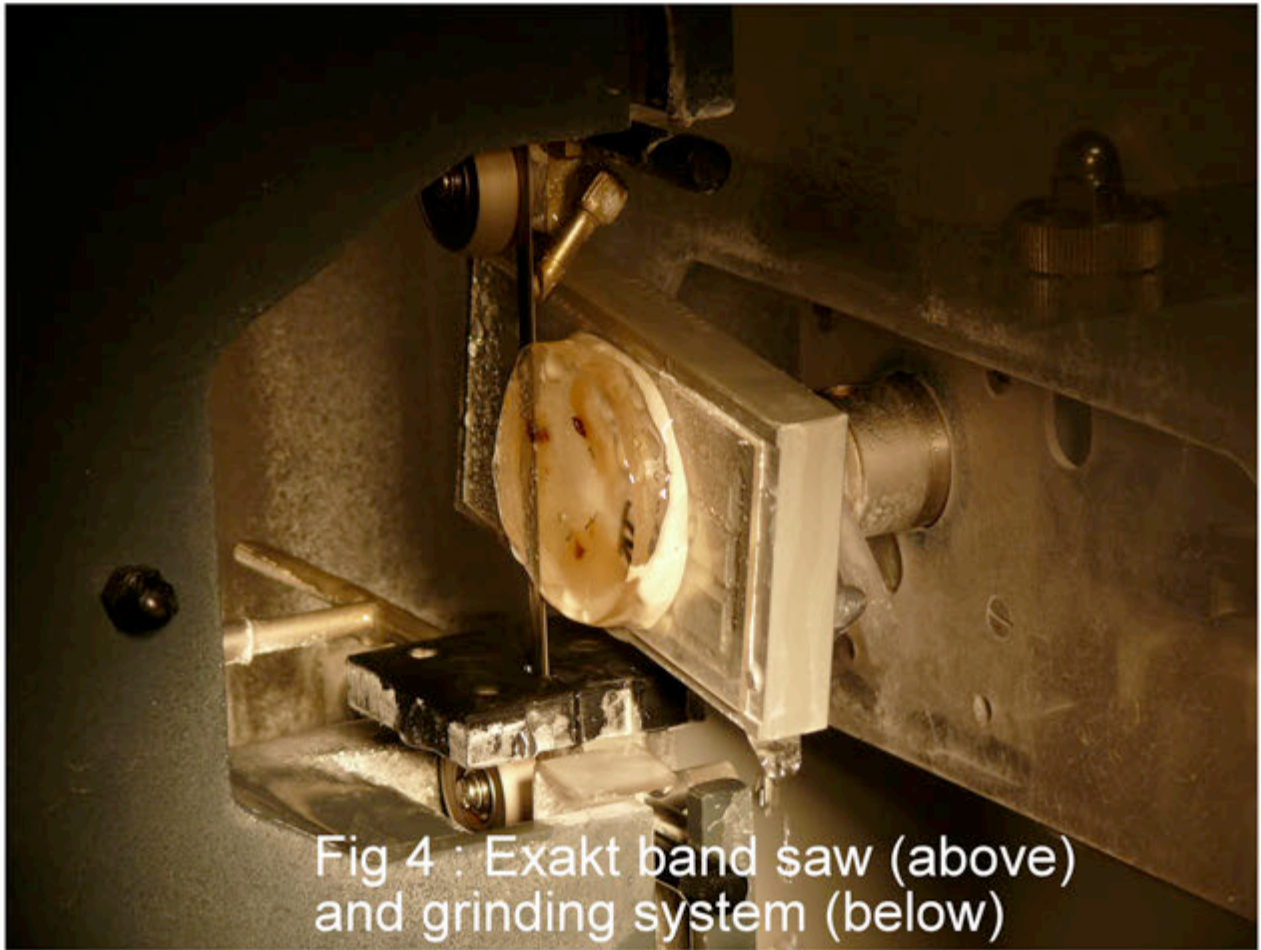


Fig 4 : Exakt band saw (above) and grinding system (below)

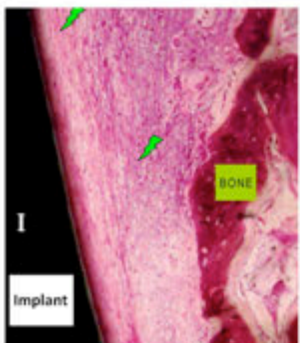
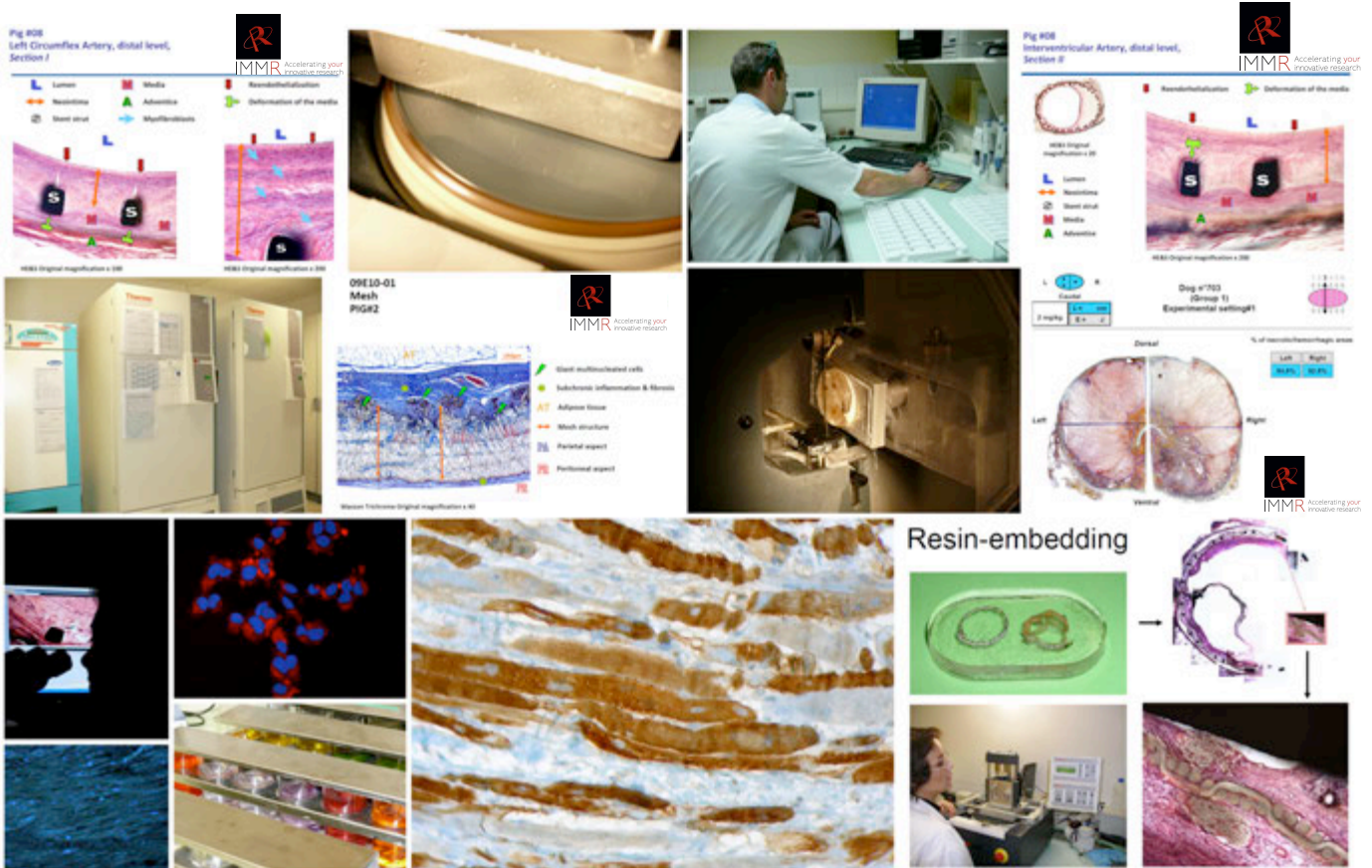


Fig 5 : Exakt dehydration and infiltration unit





## Our know-how

**Cardiovascular surgery**  
**Interventional cardiology**  
**Surgical research**  
**Complete pathology services**  
**Physician training**  
**Good Laboratory Practice**  
**Full undertaking of your project**

We have more than 20 years experience in large animal surgical research, interventional radiology, validated procedures, cutting-edge equipment and state of the art surgical suites. We have a strong know-how in cardiovascular research but also in, ophthalmology, thoracic surgery, neurosurgery, orthopedics, dentistry, urology, fetal surgery and robotics. In addition IMMR offers a state-of-the-art medical device pathology service. We follow the methods of Good Laboratory Practice to assure the highest professional standards. Our team will strive to service your study and bring your medical device to market in a timely and cost effective manner.

**A**nd as usual with our histopathological assessment, at the end of each evaluation, the sponsor receives a description of the histological evaluation criteria, a descriptive report of relevant histological lesions, morphometrical data, tabulated summaries of important findings, a discussion of significant findings with respect to the specific purposes of the study, annotated microphotographs and all reports are peer-reviewed. Our histopathology approach and our reports are written in the spirit of Good Laboratory Practice.

[A video specifically on our GLP-compliant histopathology services is available on line here:](#)

[IMMR VIDEOS  
http://www.imm-recherche.com](http://www.imm-recherche.com)