

An Introduction to Laser Bone Osteotomy

Prof Riaz

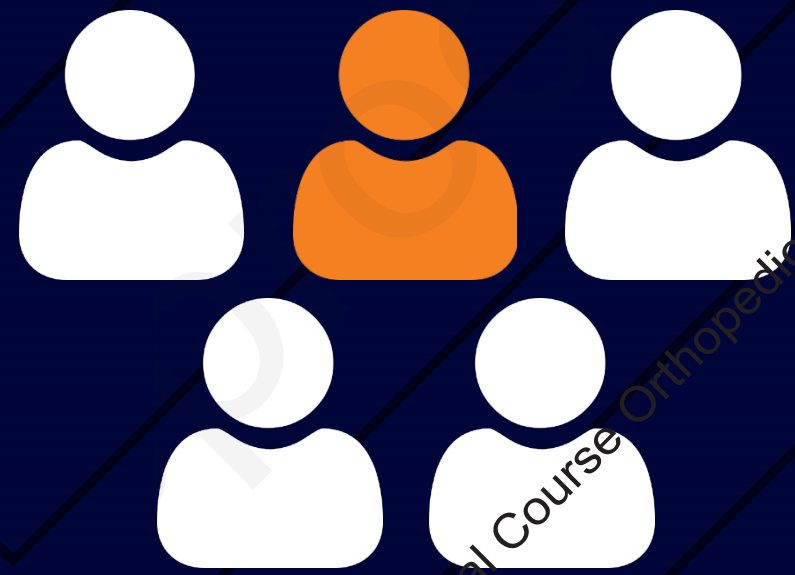
www.airo.net.au
Khan

Conflicts of Interest

Director:



Knee Arthroplasty – The need to innovate



1 in 5 are dissatisfied



3% 5-year revision rate
(aseptic loosening)



Room for improvement

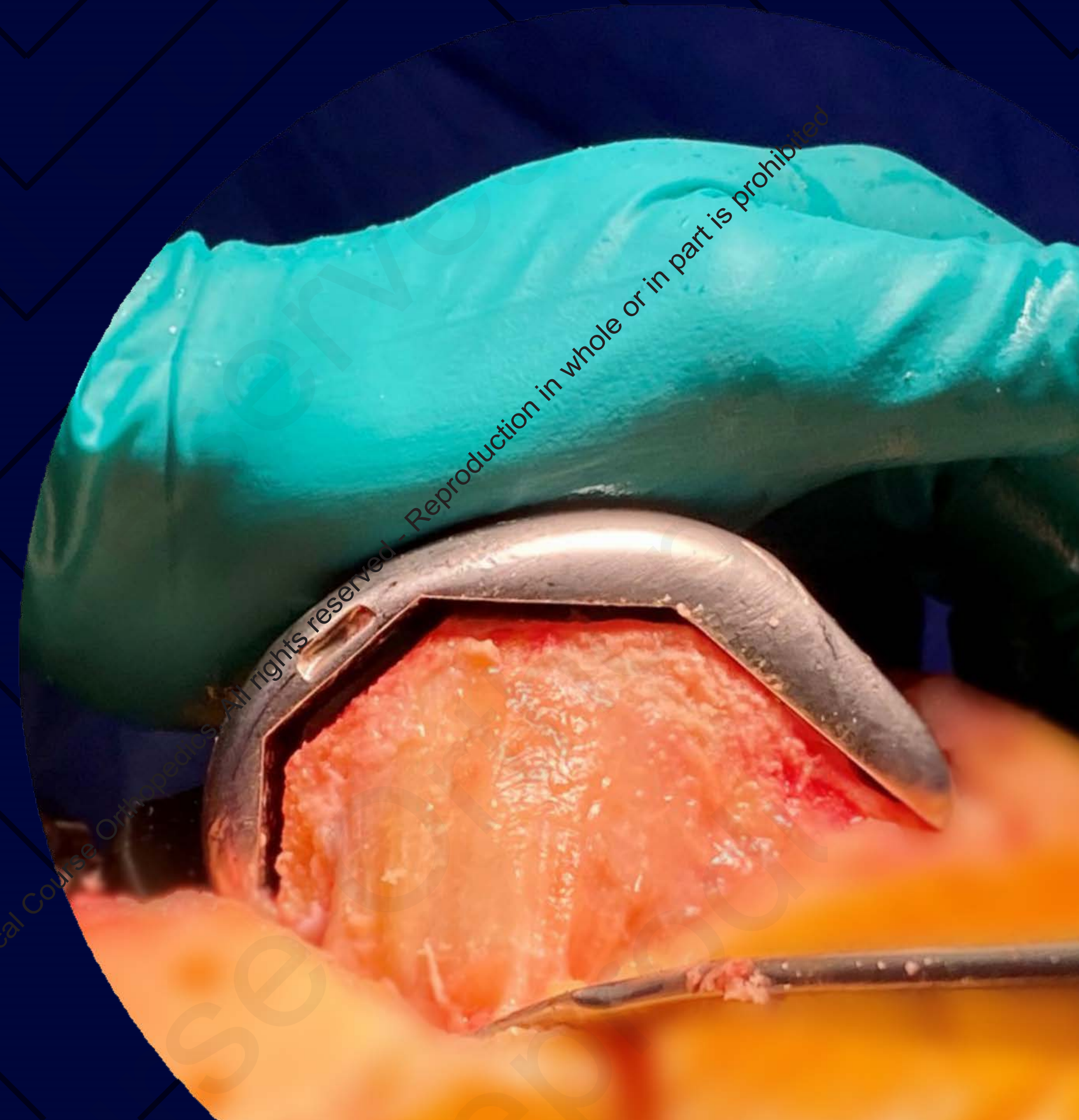
The Saw

Are saws the best way
to cut bone?



The Saw - Limitations

- Variable accuracy of cuts resulting in gaps
- Limits osteointegration as a result of thermal damage to bone cells



Ideal Osteotome - Beyond mechanical tools

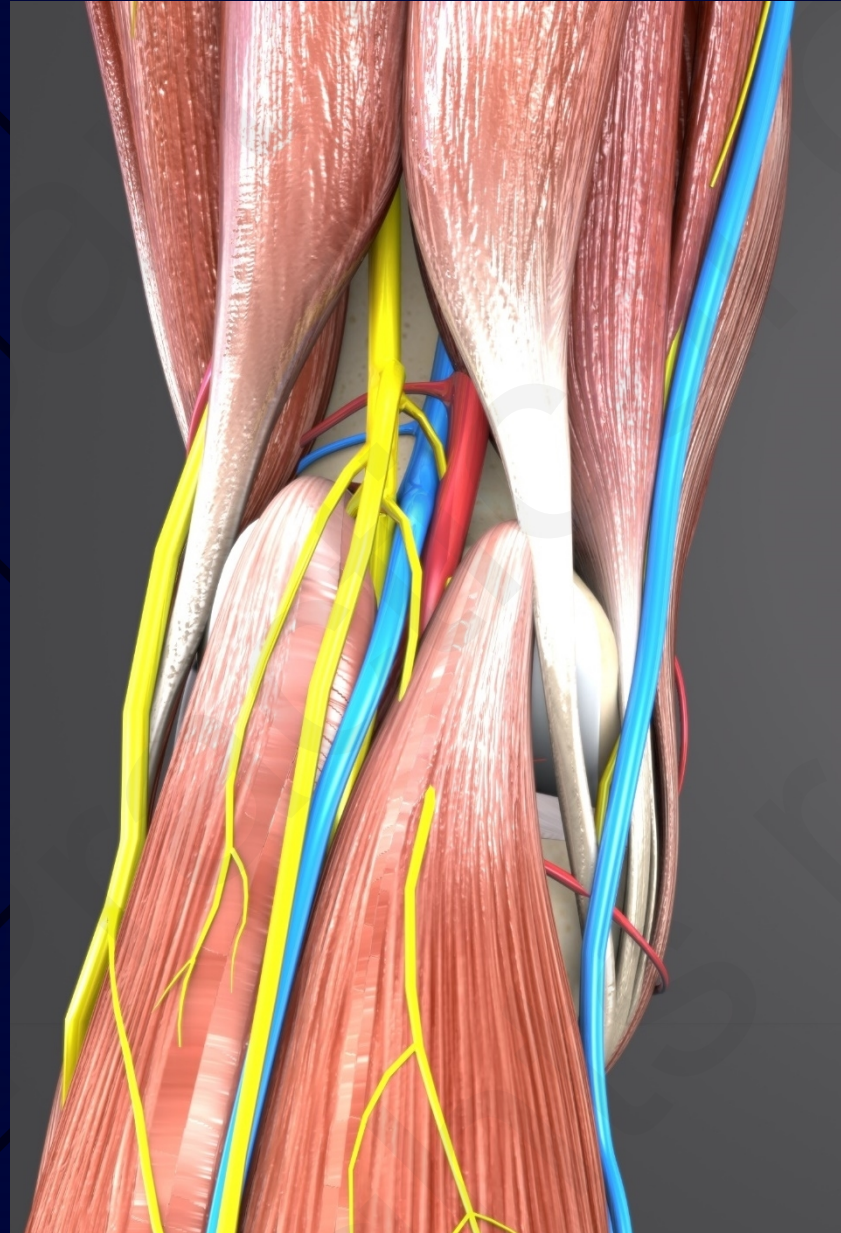


**Accurate, consistent and
fast**

Ideal Osteotome - Beyond mechanical tools



**Accurate, consistent and
fast**

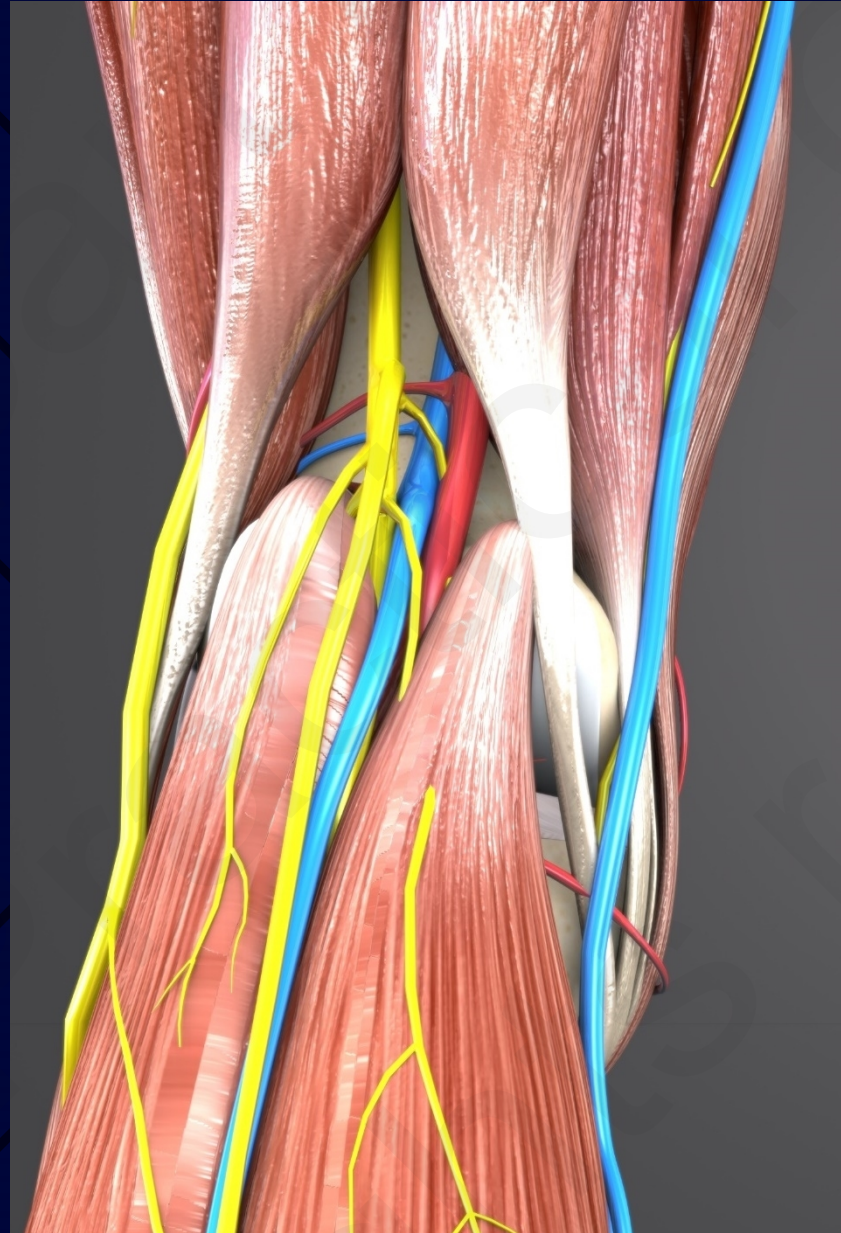


**Avoid Essential
Structures**

Ideal Osteotome - Beyond mechanical tools



**Accurate, consistent and
fast**



**Avoid Essential
Structures**



**Preserves Bone
Health**

2023 © Practical Course Orthopedics. All rights reserved - Reproduction in whole or in part is prohibited

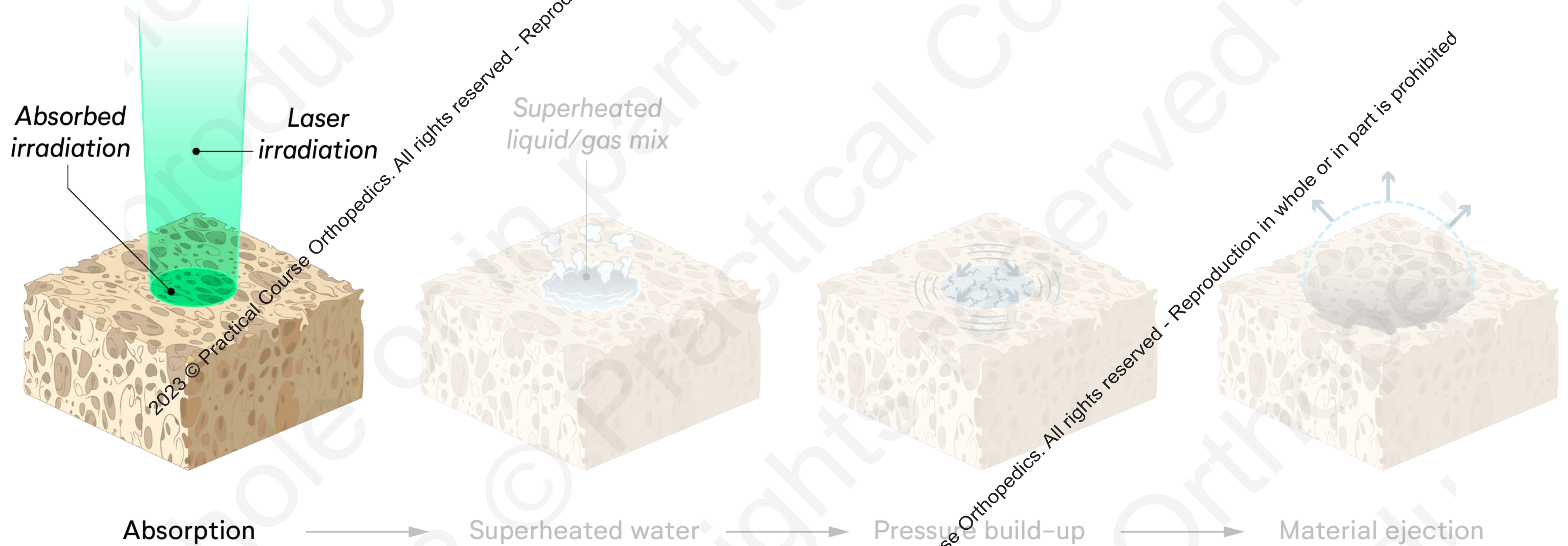
2023 © Practical Course Orthopedics. All rights reserved - Reproduction in whole or in part is prohibited

Proproduction

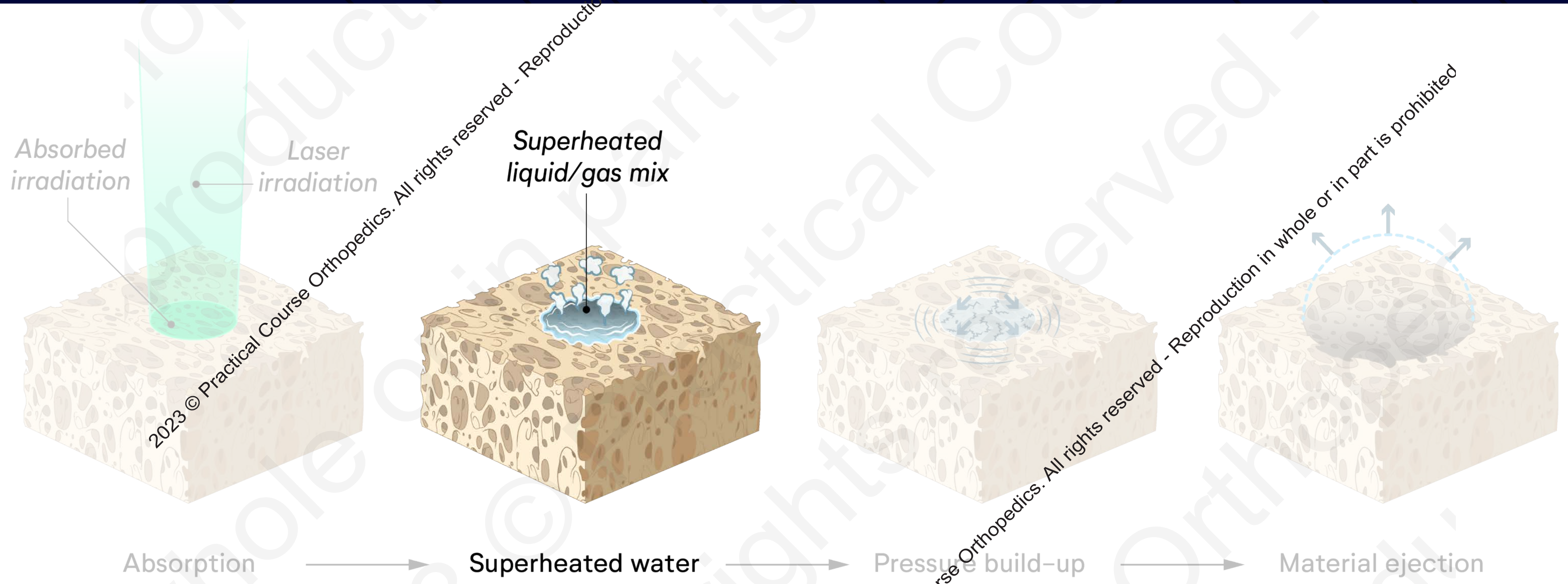
Proproduction

Proproduction

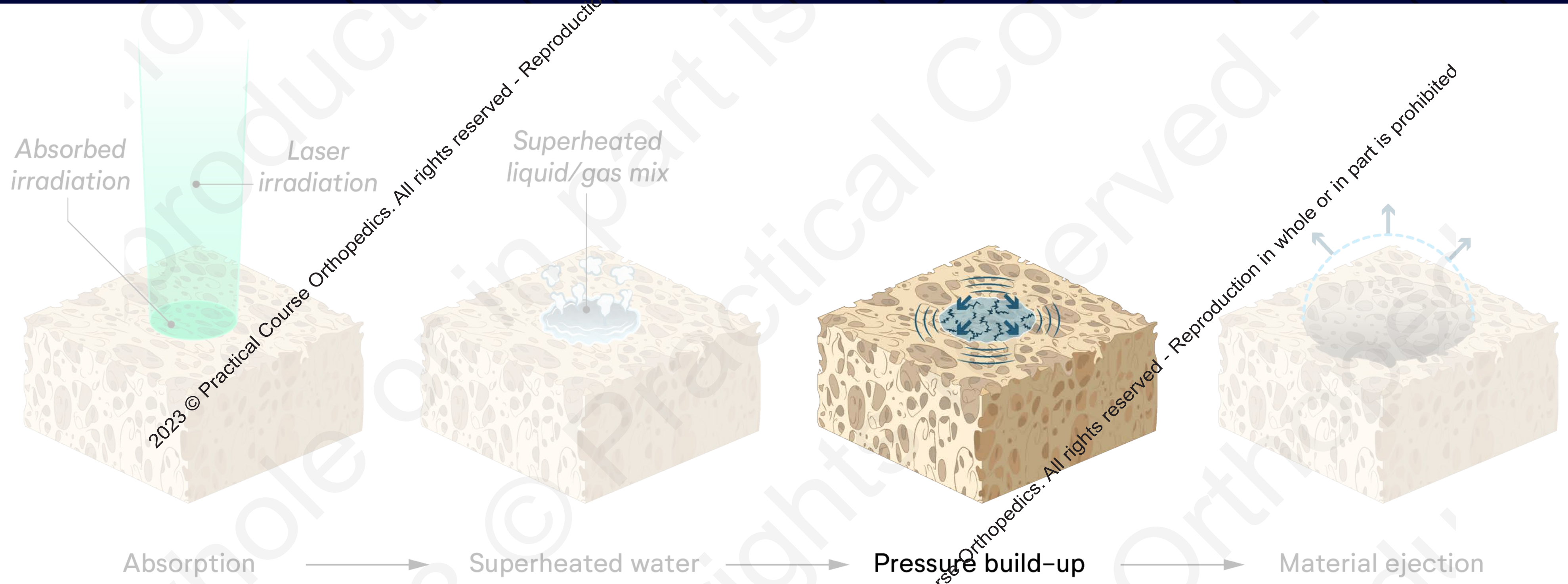
Laser Ablation - How bone is removed



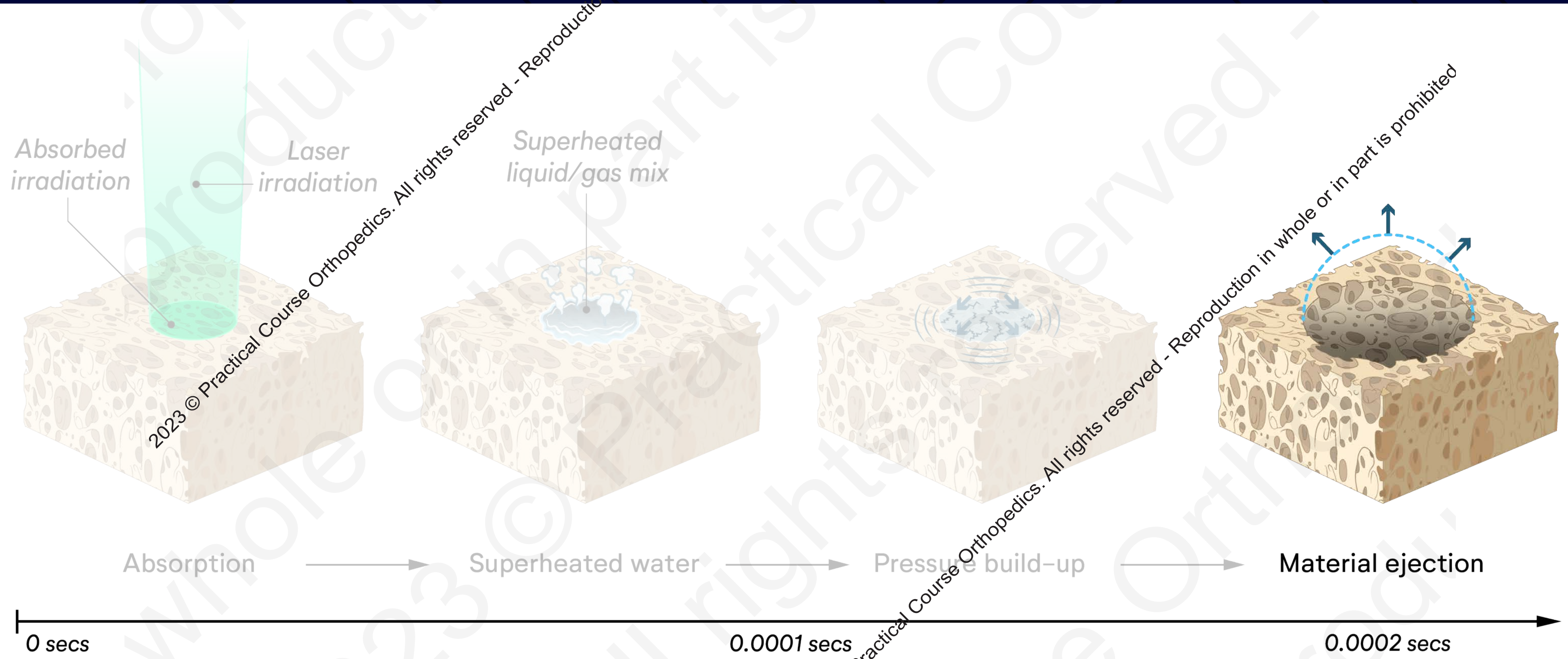
Laser Ablation - How bone is removed



Laser Ablation - How bone is removed



Laser Ablation - How bone is removed

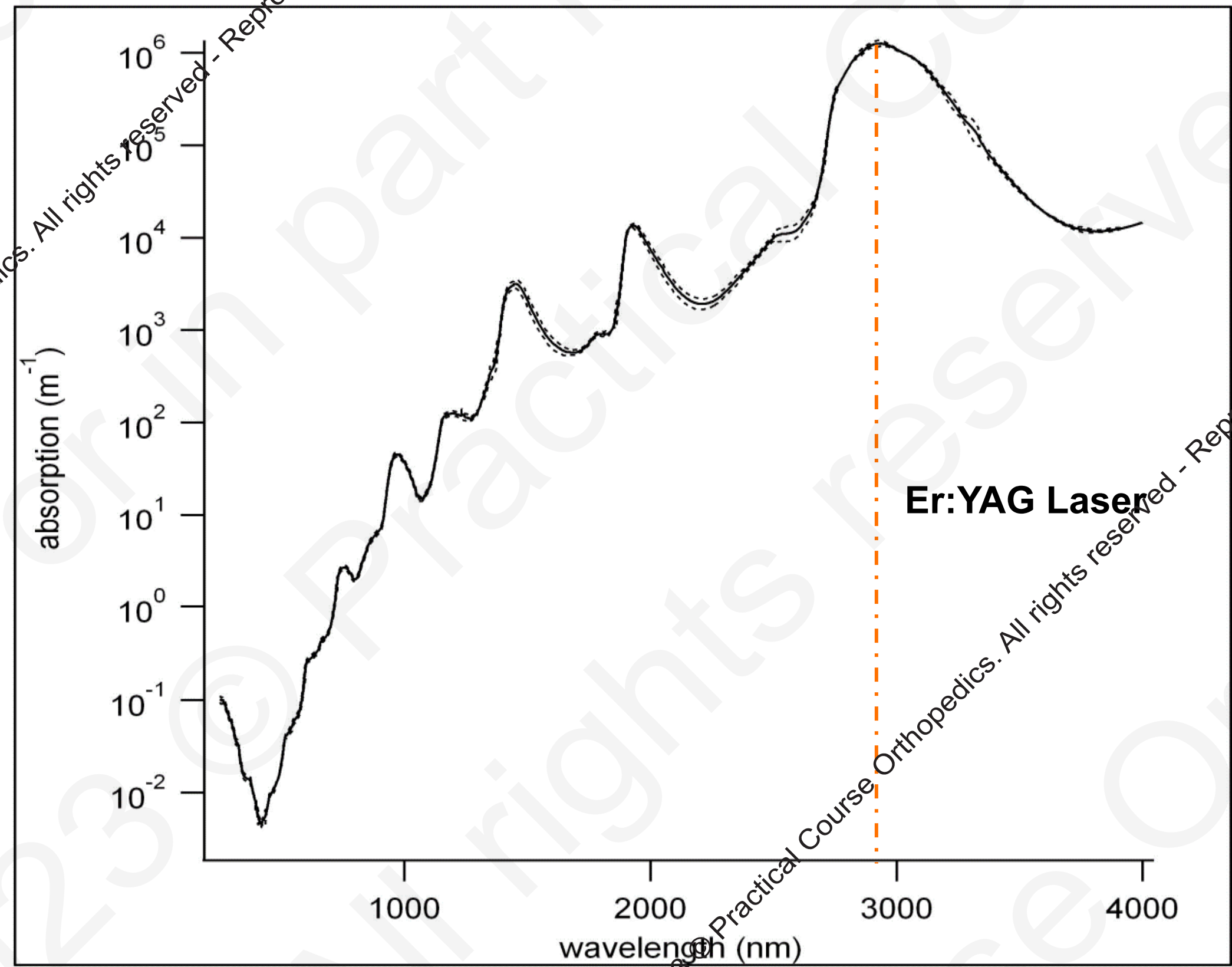


2023 © Practical Course Orthopedics. All rights reserved - Reproduction in whole or in part is prohibited

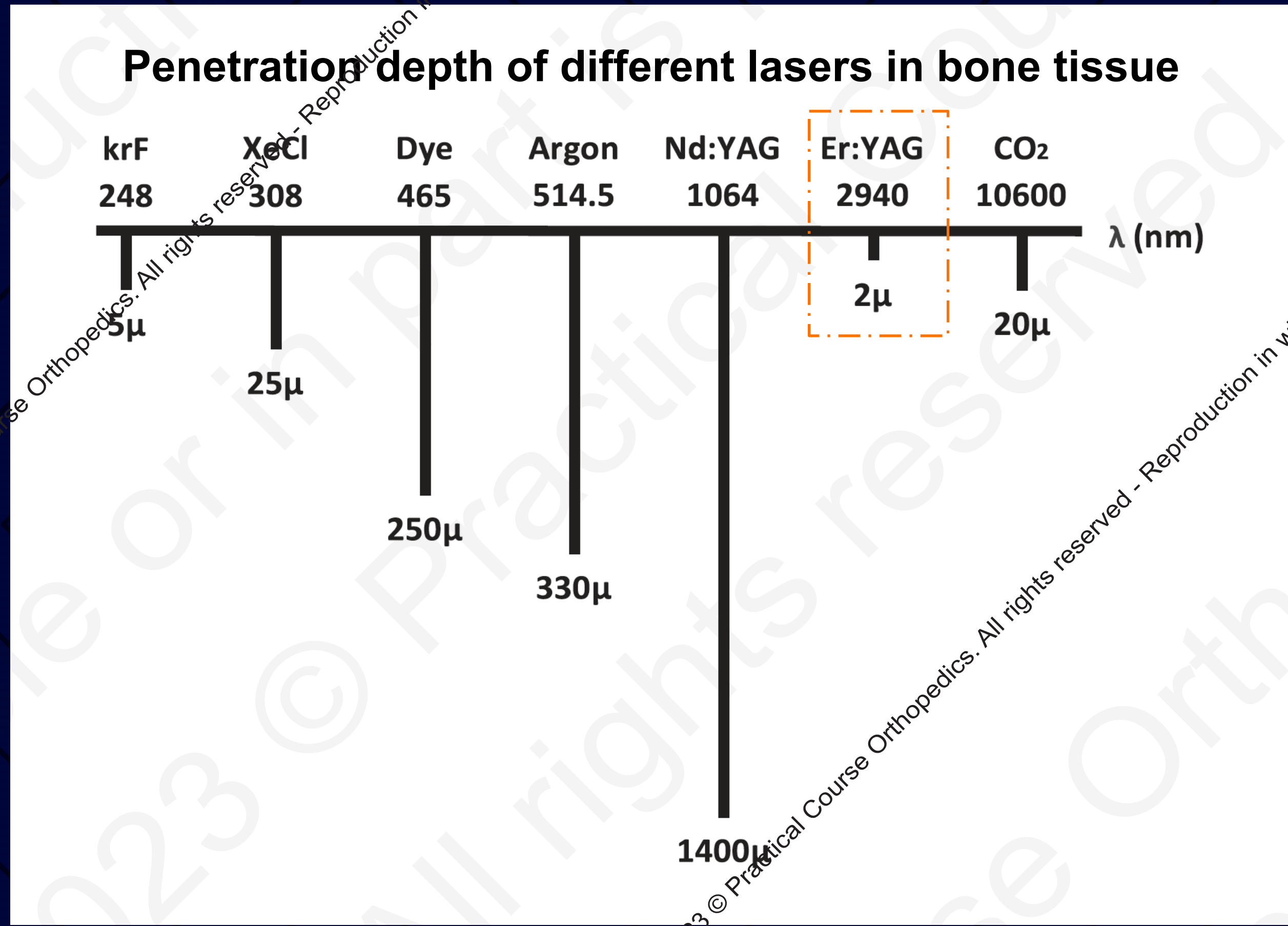


Laser Bone Sculpting - Which laser and why

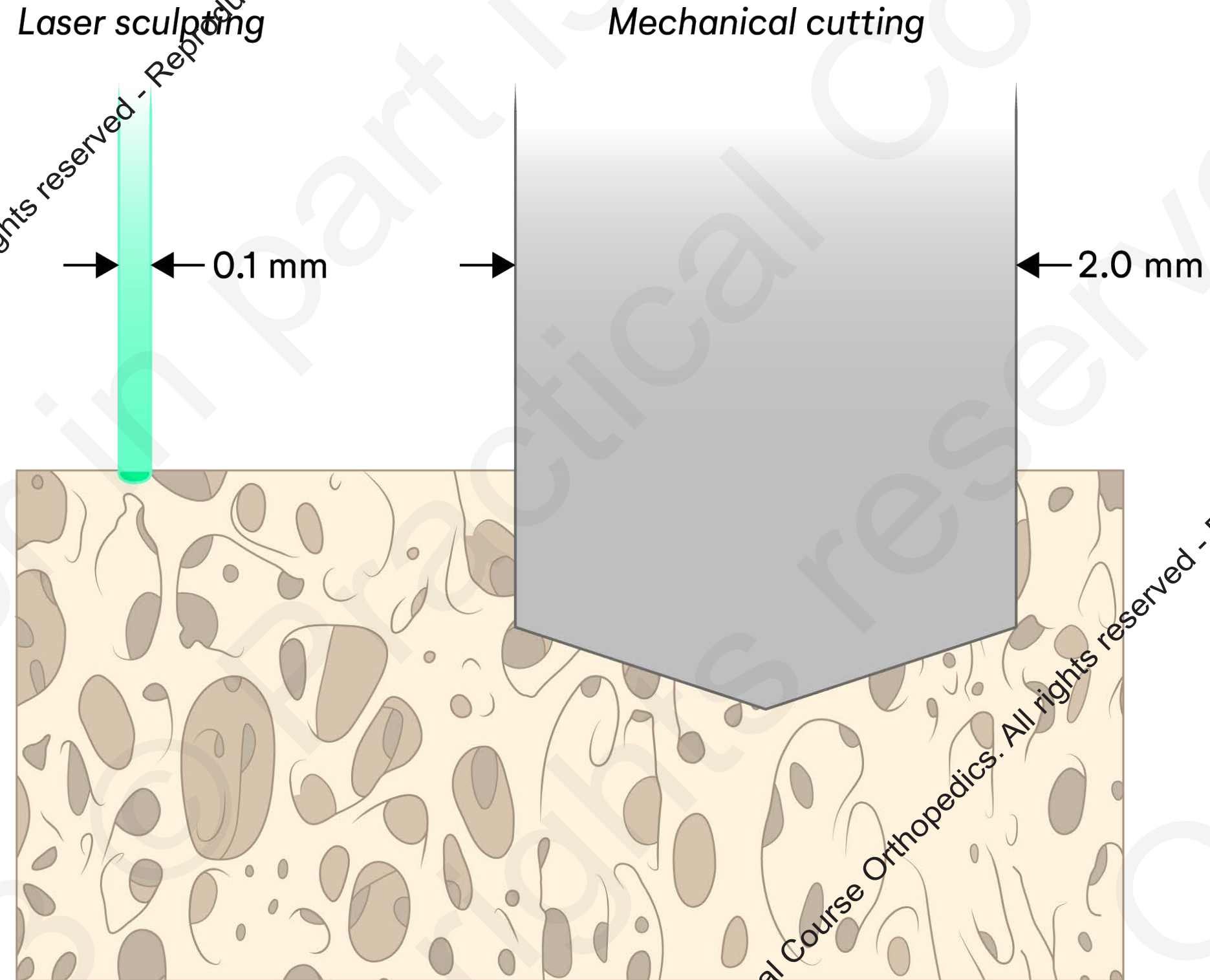
Light absorption of water at varying wavelengths



Laser Bone Sculpting - Which laser and why



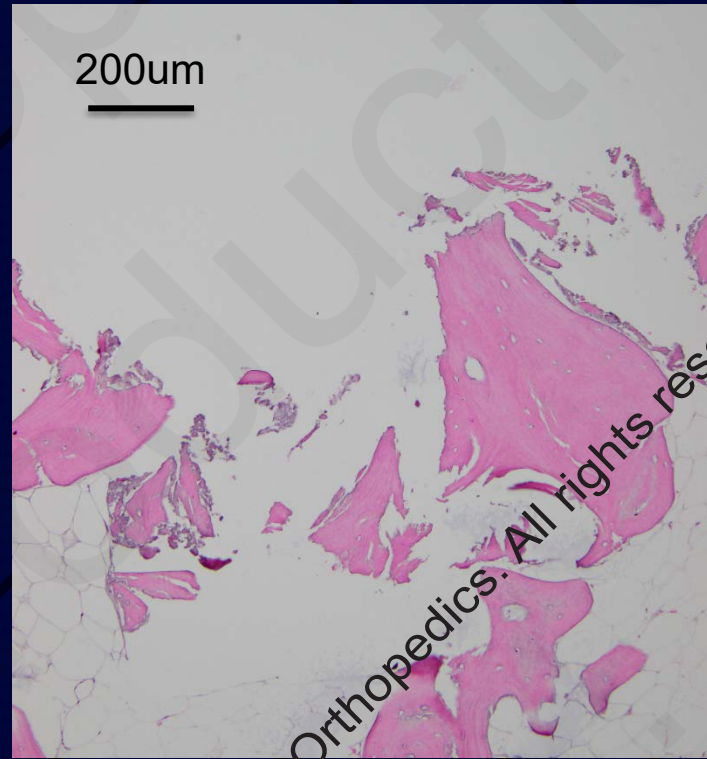
Laser Bone Sculpting - Sub mm precision



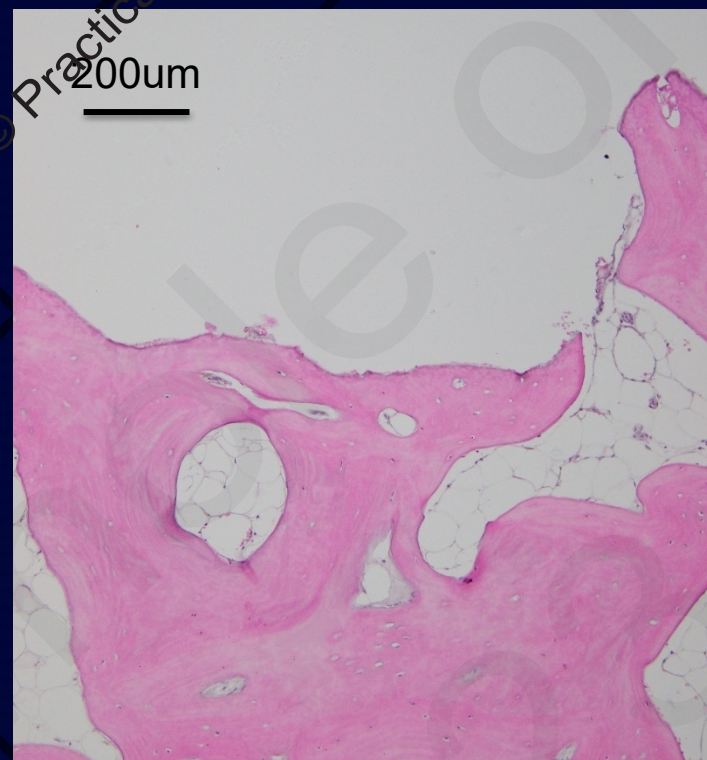
2023 © Practical Course Orthopedics. All rights reserved - Reproduction in whole or in part is prohibited

Laser Bone Sculpting - Osteointegration potential

Saw
Surface

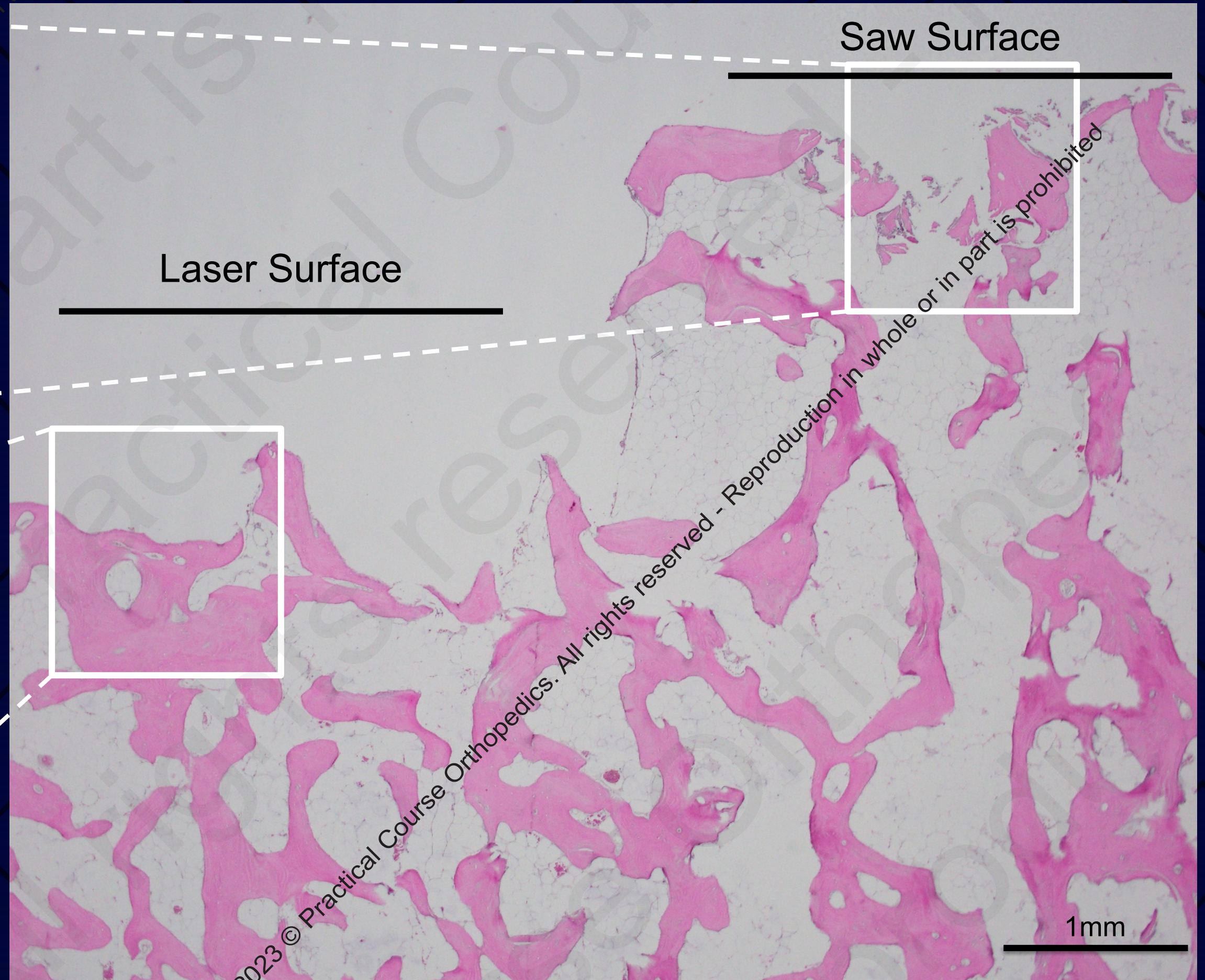


Laser
Surface

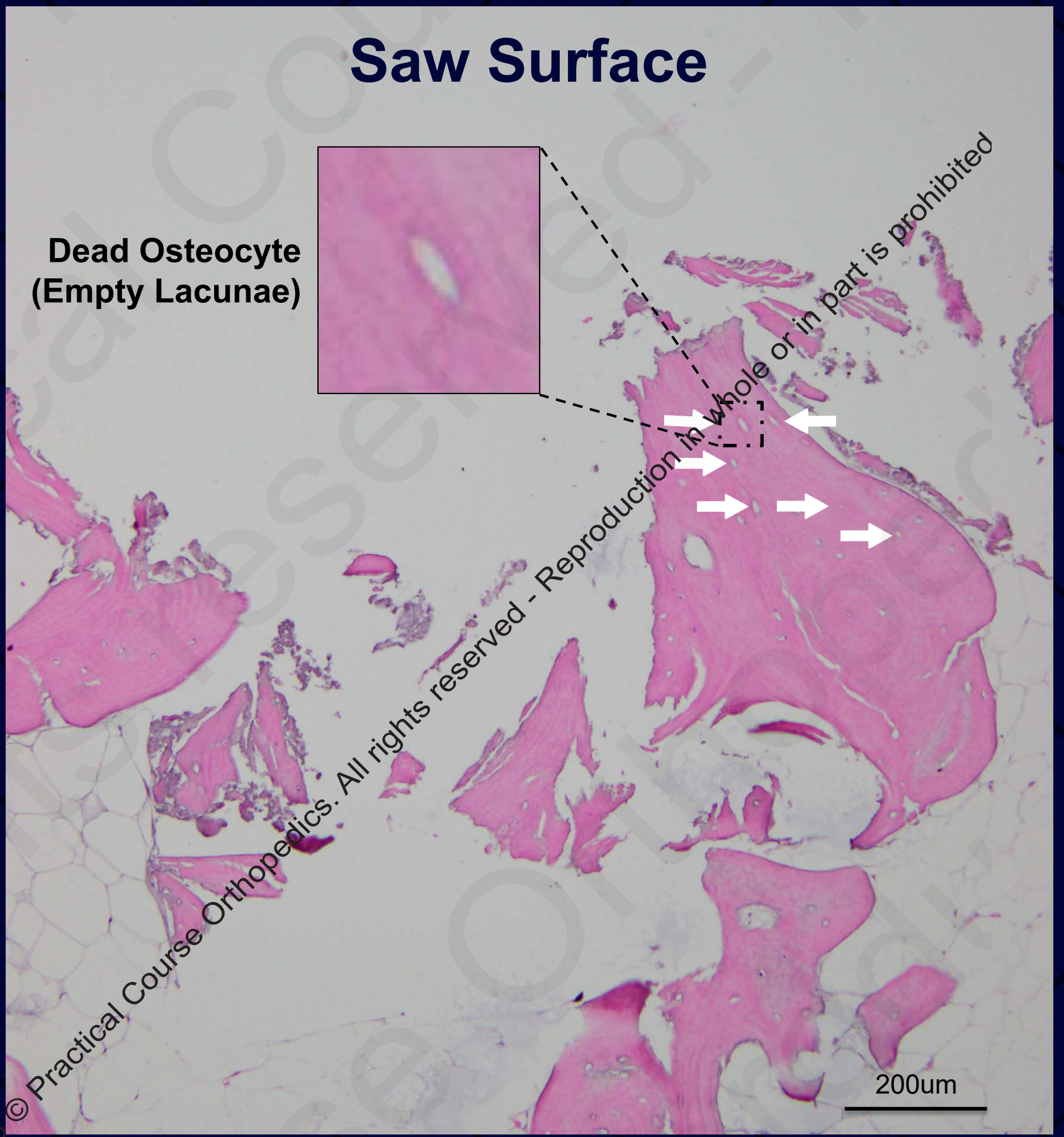
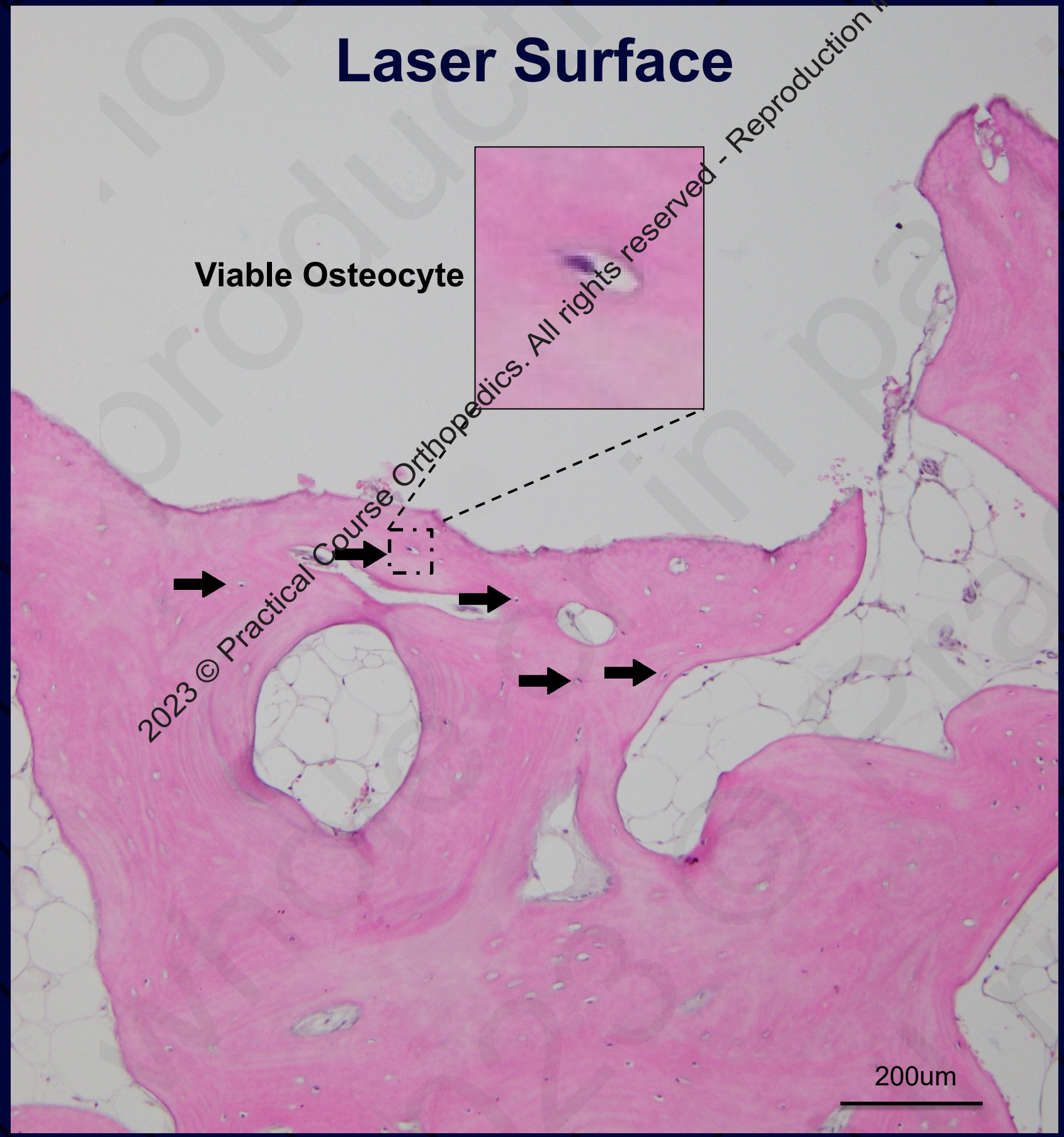


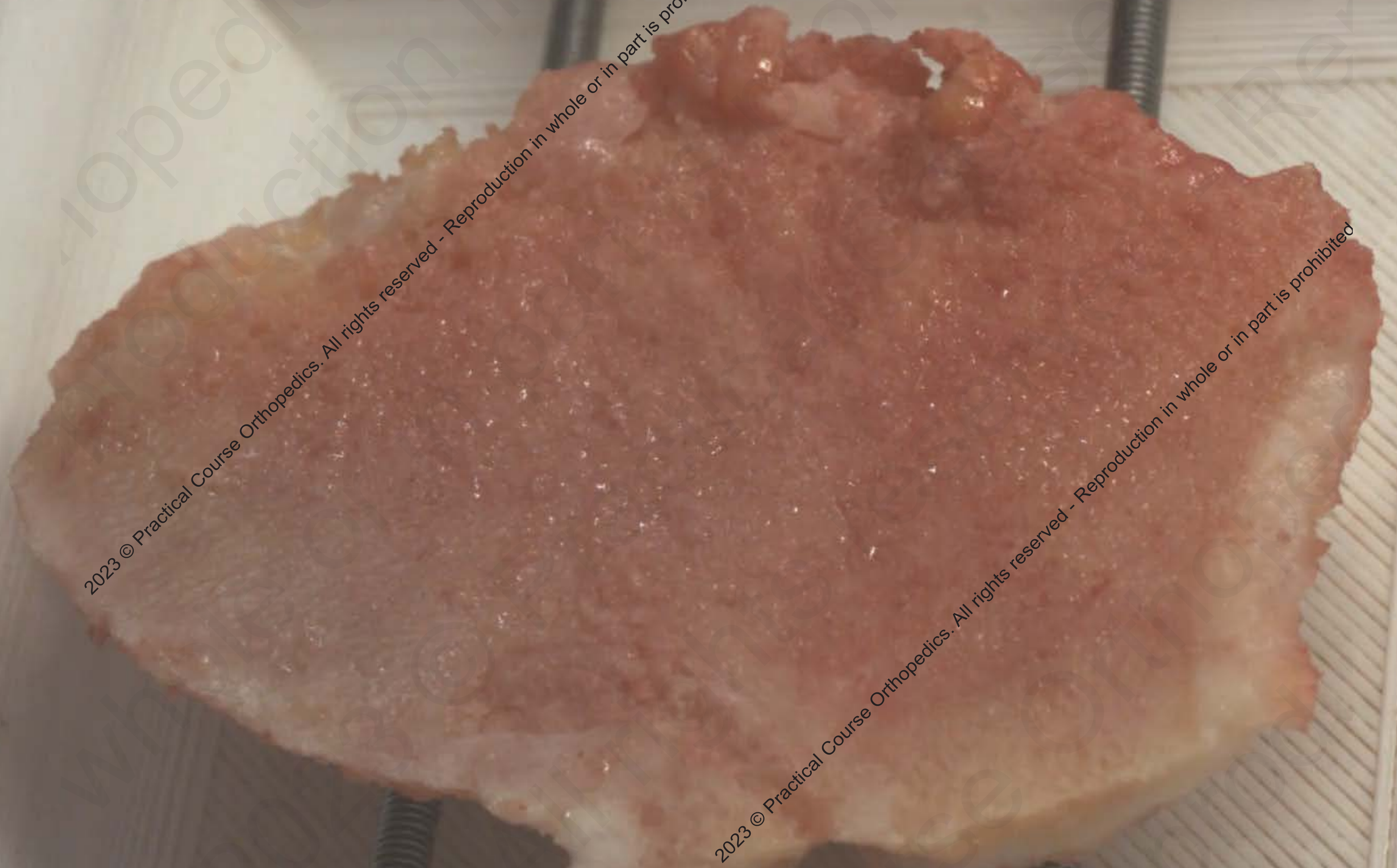
Laser Surface

Saw Surface



Laser Bone Sculpting - Osteointegration potential

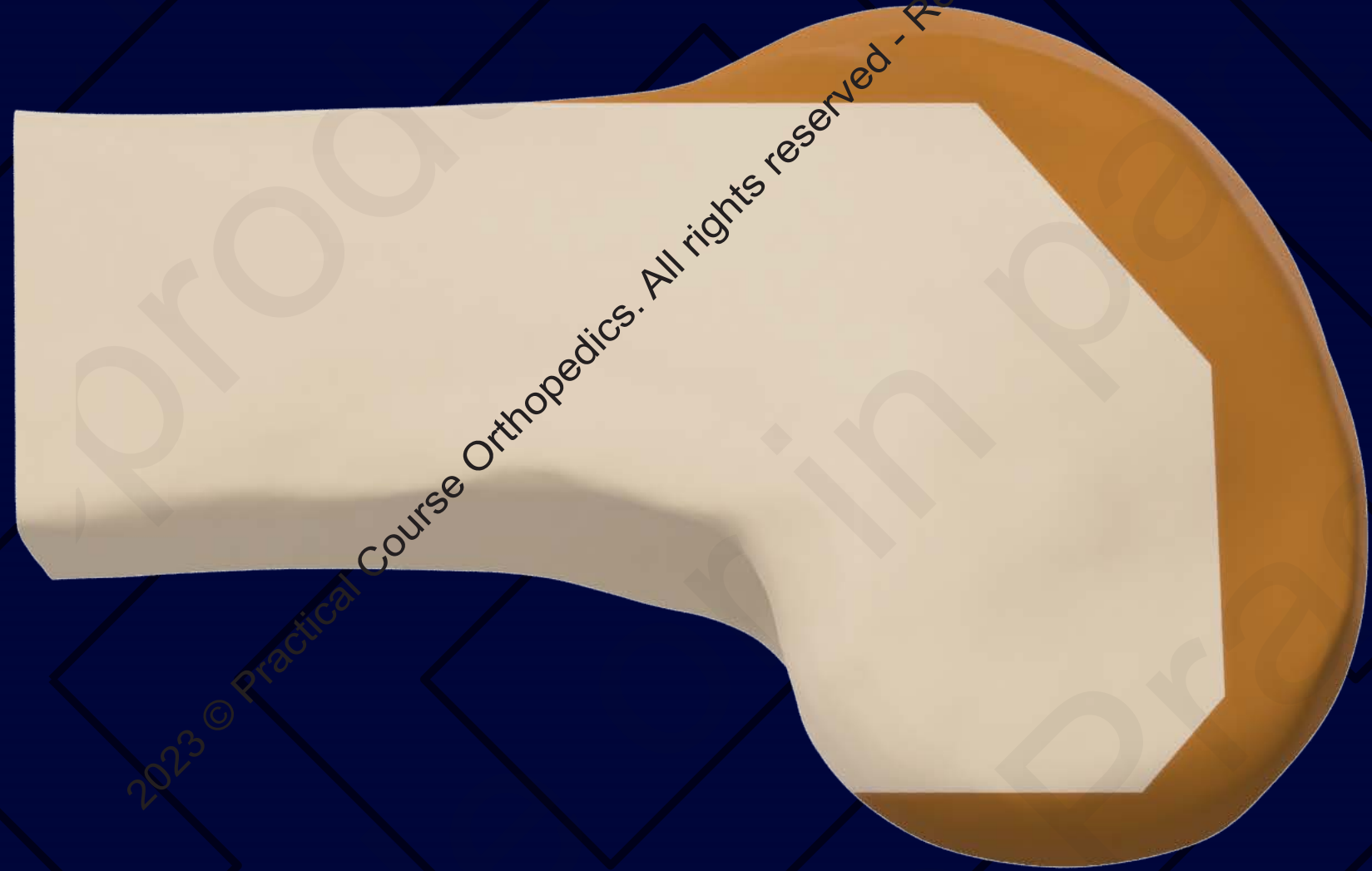




2023 © Practical Course Orthopedics. All rights reserved - Reproduction in whole or in part is prohibited

2023 © Practical Course Orthopedics. All rights reserved - Reproduction in whole or in part is prohibited

The Potential - Sparing bone

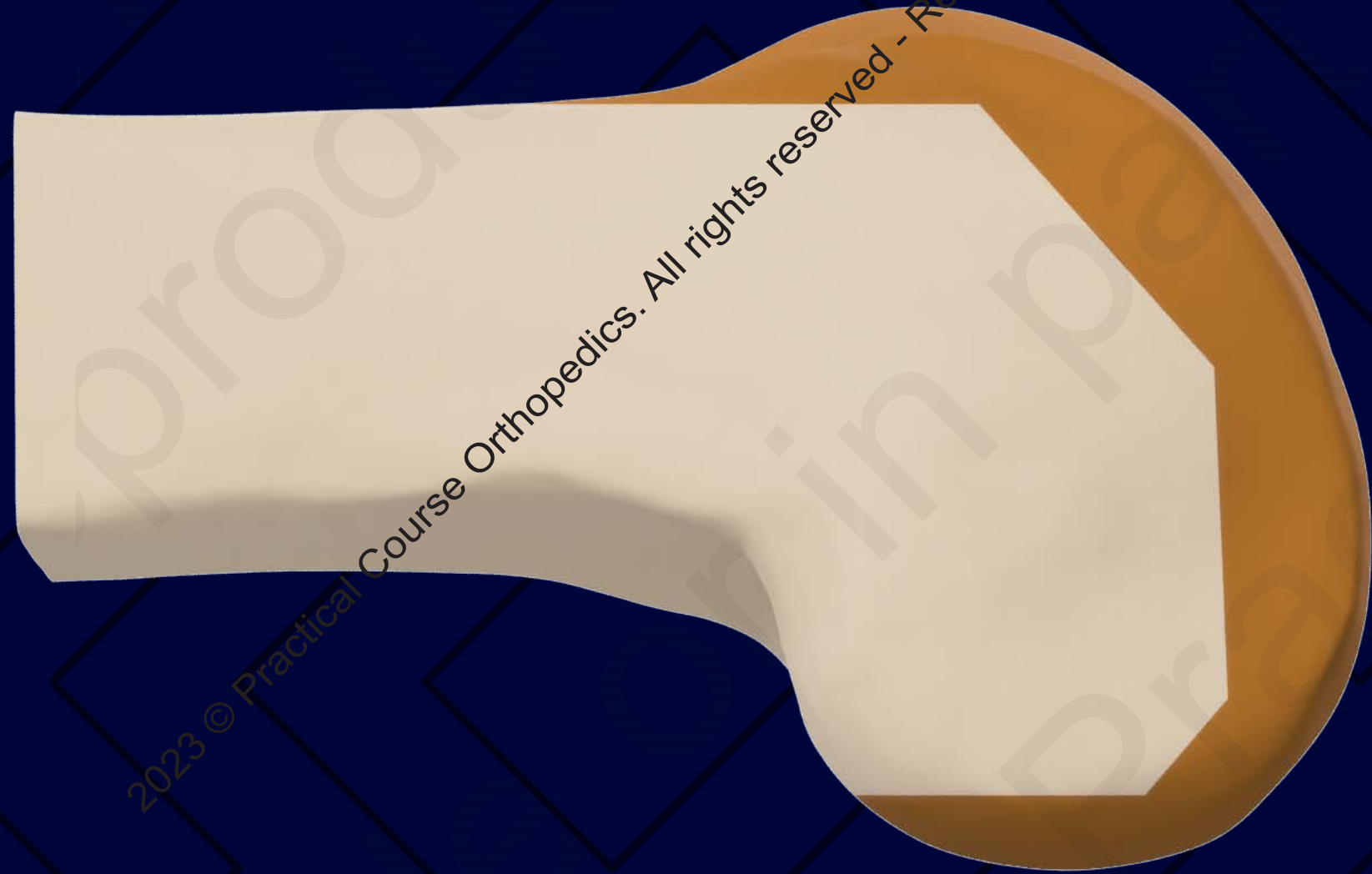


The Standard
Cuts

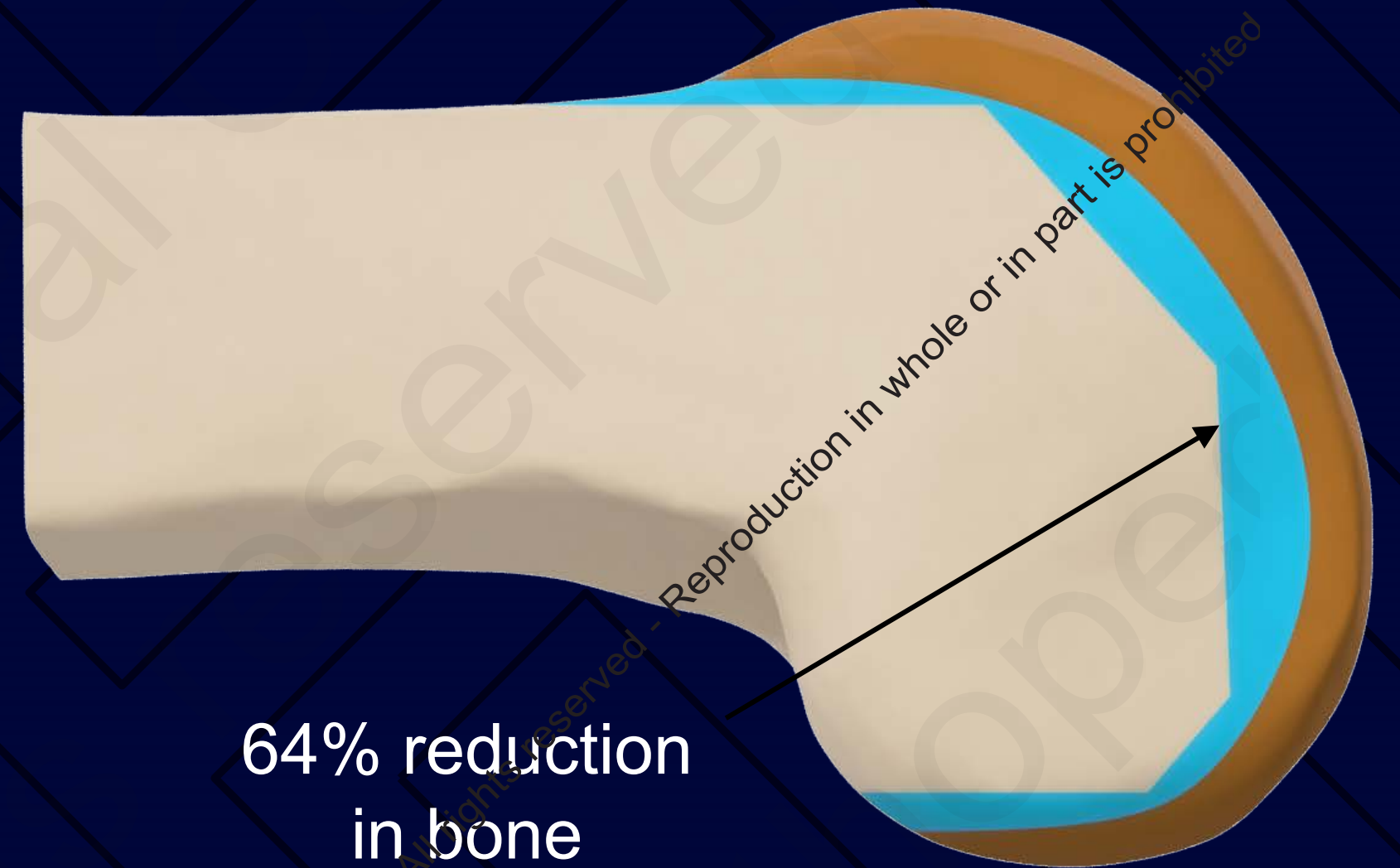


Laser Bone Sculpted Surface

The Potential - Sparing bone



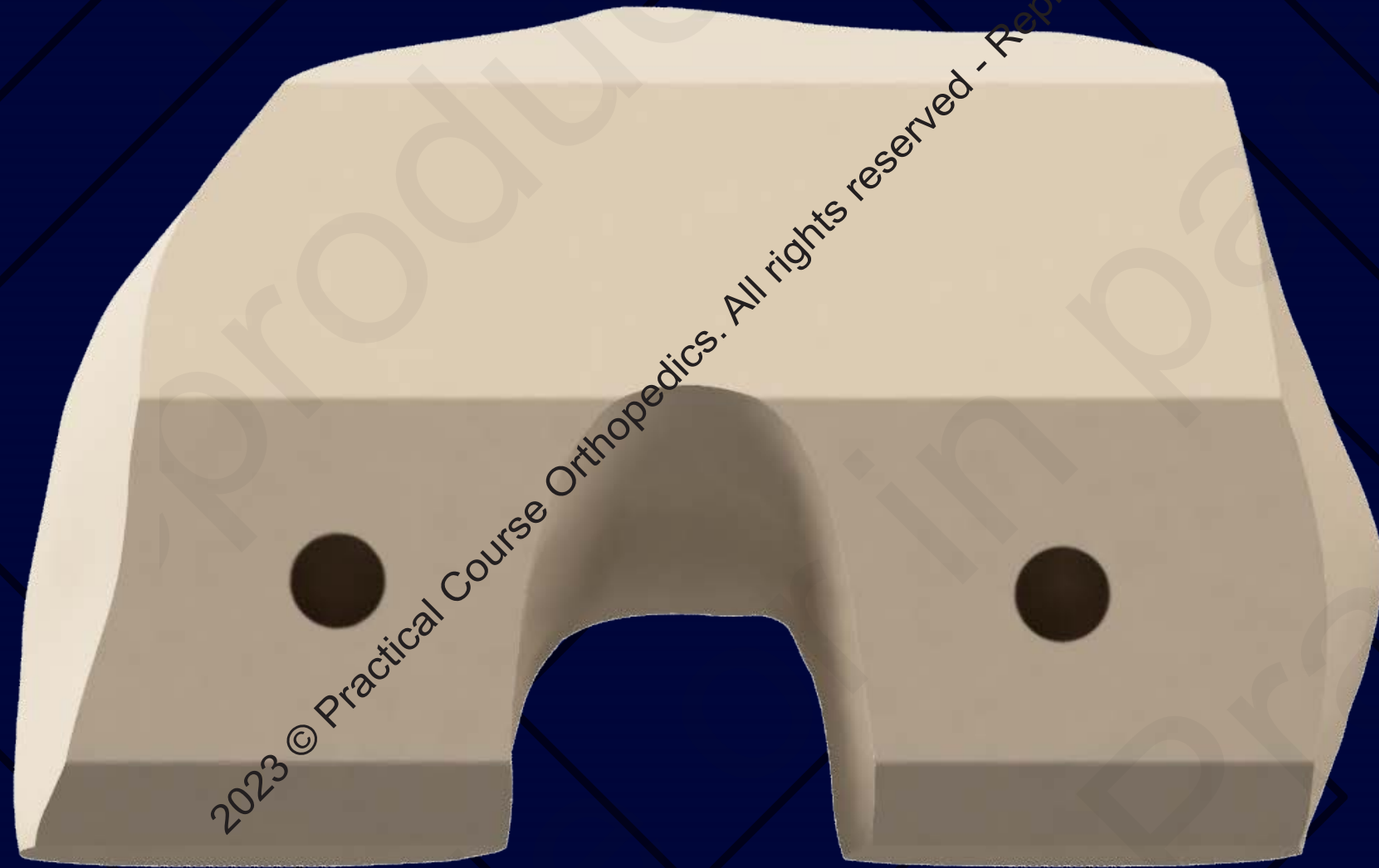
The Standard
Cuts



64% reduction
in bone
removal

Laser Bone Sculpted Surface

The Potential - Increased bone-prosthetic surface area



The Standard
Cuts

Up to **70%** increase in
bone-prosthetic contact area



Complex Geometry

The Opportunity - The forgotten knee



Retain Healthy Tissue

- Resect less bone



Natural Joint

Function Preservation?

- Anatomic geometries



Bond for Life

- Strong osteointegration



www.airo.net.au