



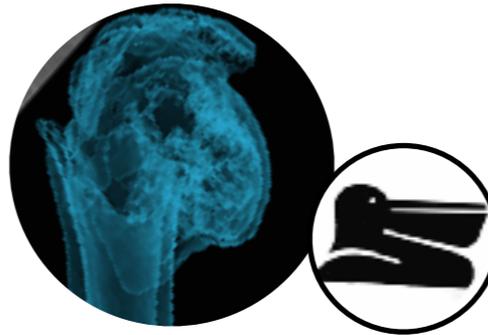
SPLIT-HEAD FRACTURES OF THE PROXIMAL HUMERUS

A. Fernández, J. Jupiter, S. Lambert, M. Jaeger, P. Regazzoni

Does definition matter?

- Are rare (5%)?
or not so rare (25%)?

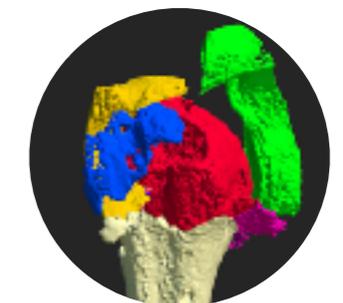
- The pelican and Double-Contour sign.



- Is AVN associated to split-head fractures?



- Are 3D interactive colored models a useful tool for a better understanding of split-head fractures?



Start-to-finish full HD
data from each case
is available at icuc.net
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meaning the full set of data used by the authors is accessible through our platform.

BACKGROUND

“A particular fracture pattern is the so-called head-split fracture, which is rarely encountered but represents a serious treatment challenge”

“Head-split fractures account for less than 5% of proximal humerus fractures and occur when the humeral head cleaves as it impacts”

“A clear definition of head-split fractures is lacking in the current literature”

(Scheibel 2019)

“Head-split fractures are a subgroup of proximal humerus fractures in which the fracture line affects the articular surface”

(Peters 2020)

“A head split fracture is present if at least 20% of the articular surface is involved” (Guix 2009) (Schrader 2005)

“A significant portion of the head remains attached to the greater tuberosity” (Kellam 2007)

“Special fracture dislocations because parts of the articular surface are displaced outside the joint” (Neer 1970)

“The term split-head is often associated with AVN” (Hertel 2004)

***Should we argue about definitions or can we rather live with more than one?
Is this relevant, or does it not matter as long as we precisely know how is it called what?***

“Head-split fractures are a subgroup of proximal humerus fractures in which the fracture line affects the articular surface”

(Peters 2020)

Split fractures may be either:

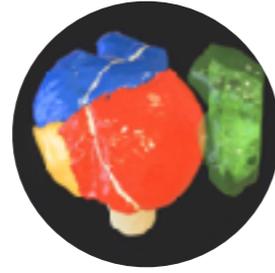
- displaced or undisplaced (joint step or no joint step),
- fracture-dislocations or not fracture-dislocations,
- larger or not larger than 20% of the joint surface.

According to above stated definition, we found:

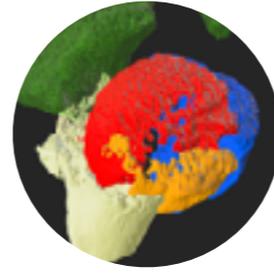
25 cases of split-head PHF (20 edge) out of 100 3D interactive colored models



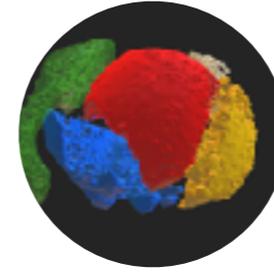
11-VD-036



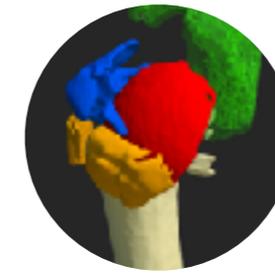
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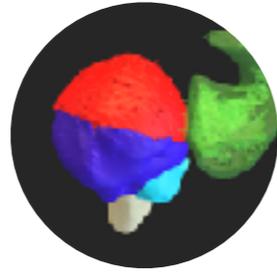
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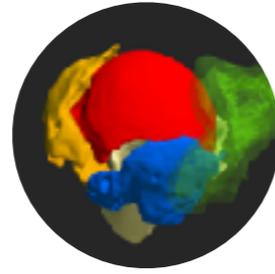
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11-AD-223



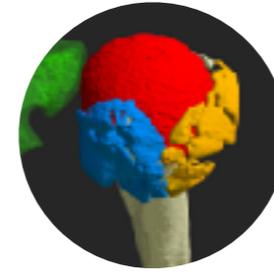
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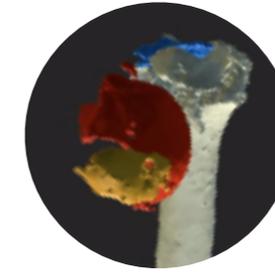
11-VI-284 NOP



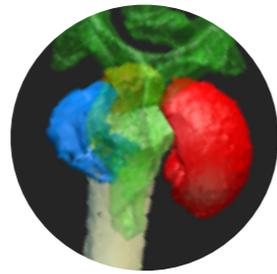
11-VI-321 NOP



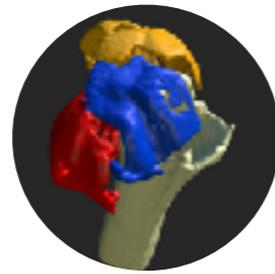
11-VI-325 NOP



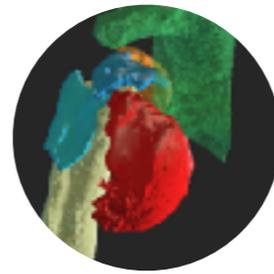
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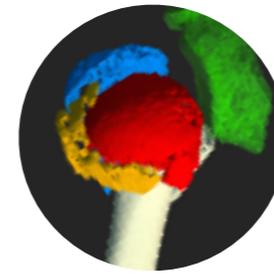
11-PD-335



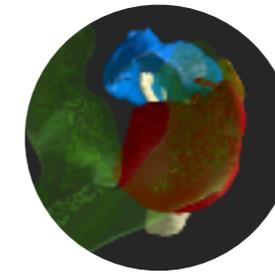
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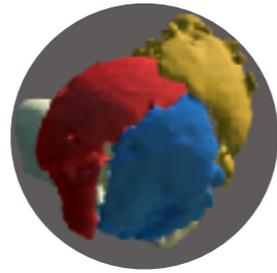
11-AD-520



11-VI-679



11-PD-692



11-VD-707 NOP



11-VI-720



11-VD-729



11-VI-757



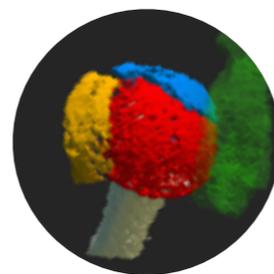
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11-VI-832 NOP



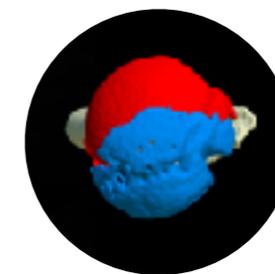
11-VI-850



11-VI-904 NOP



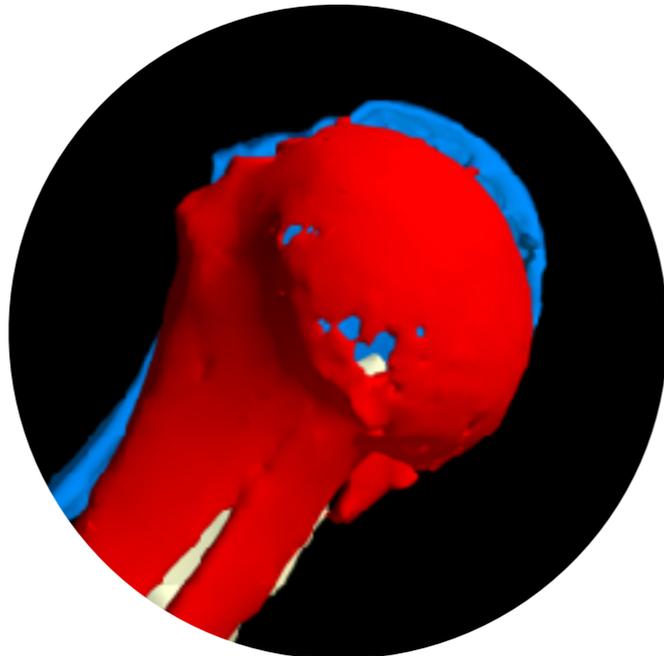
11-VD-954



11-VD-977

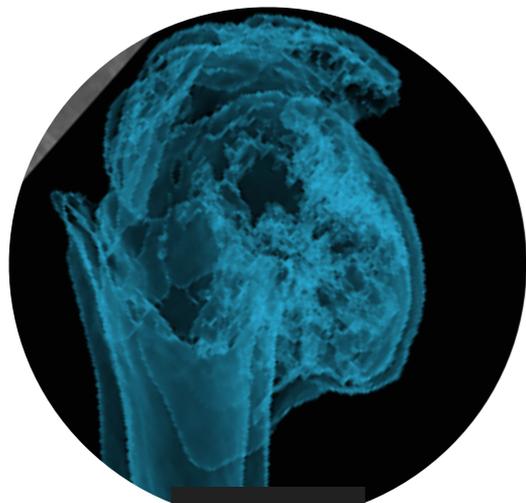
Case Examples, Selected from ICUC Database of:

The Double-Contour sign

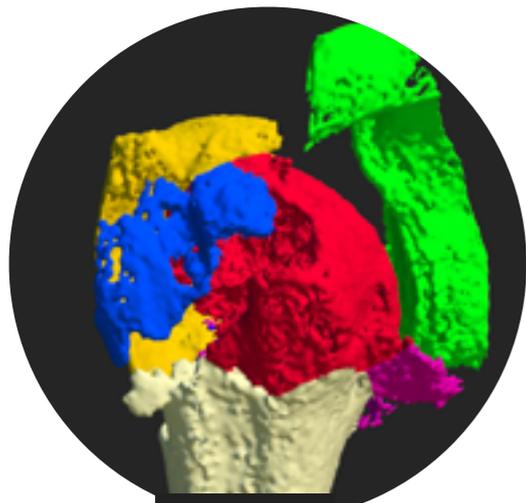


Case Examples, Selected from ICUC Database of:

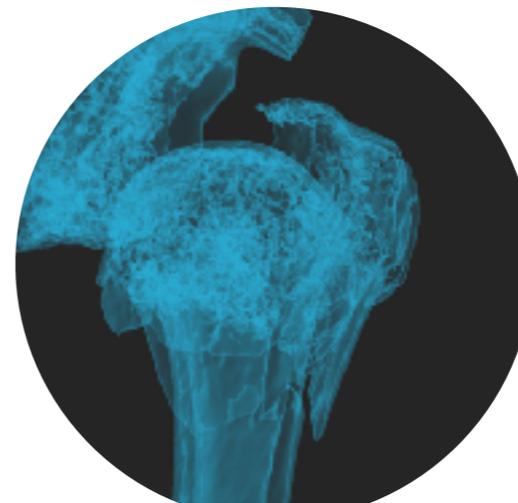
The Pellican sign



11-VD-977

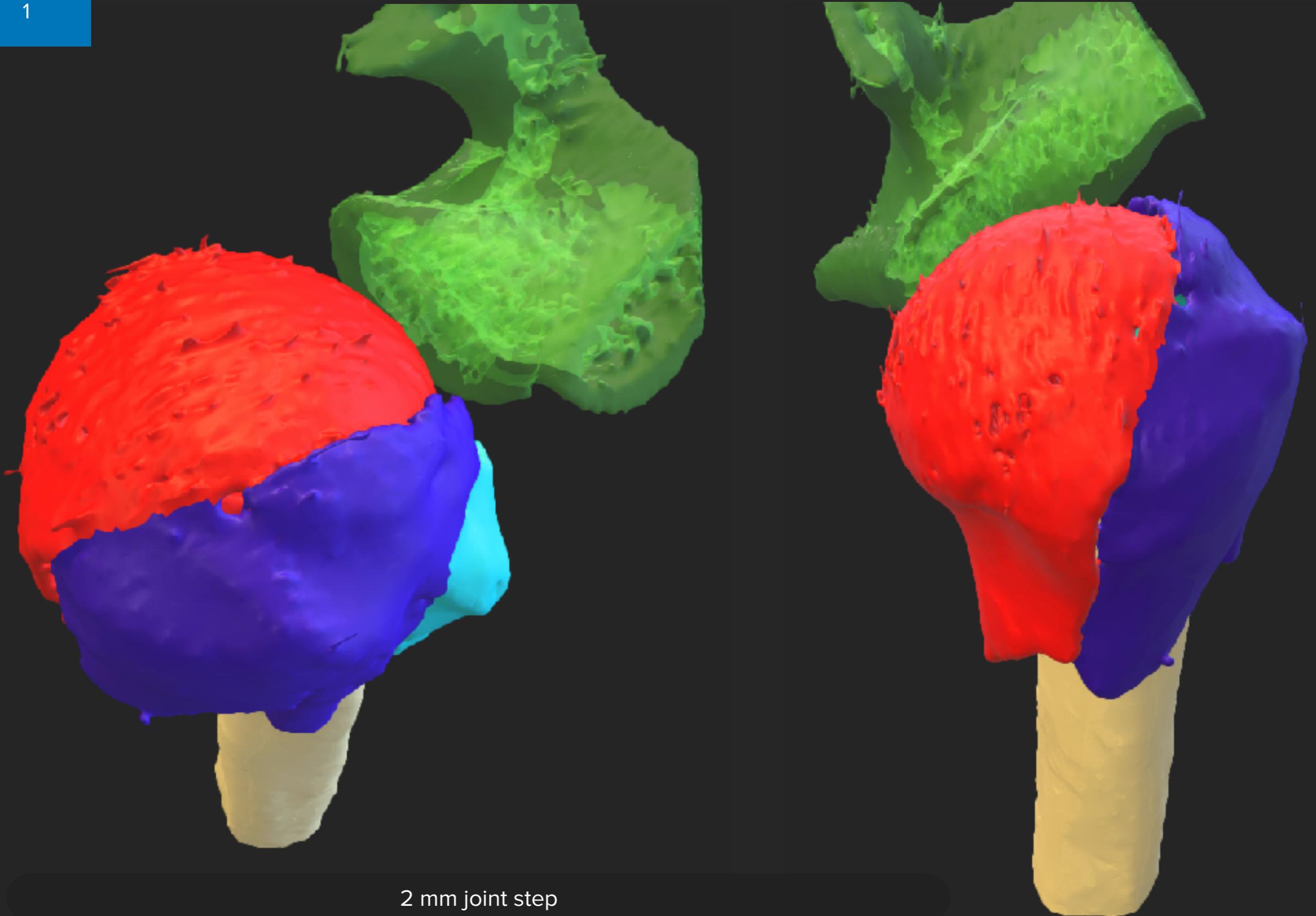


11-VI-456

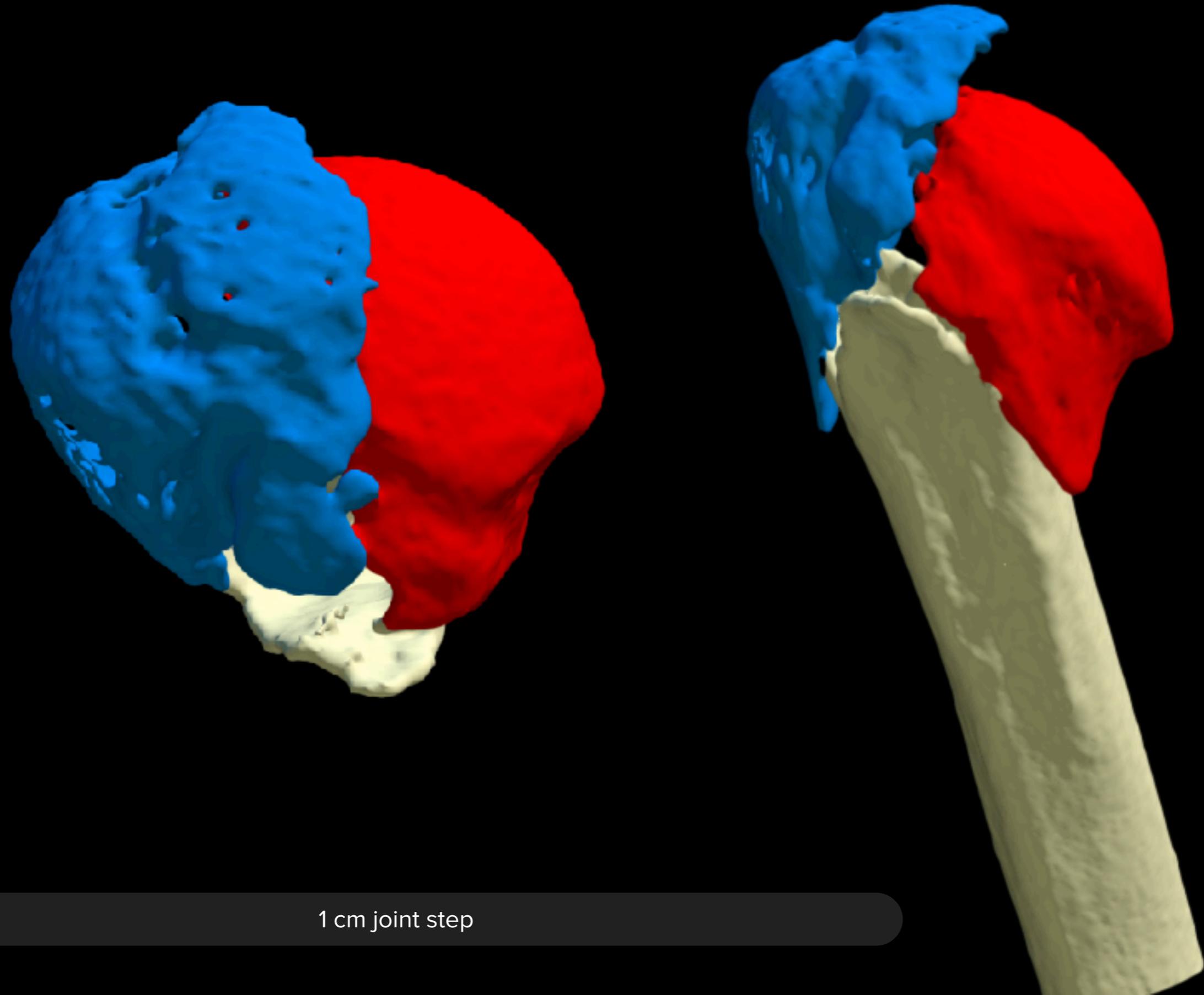


11-VI-679





2 mm joint step

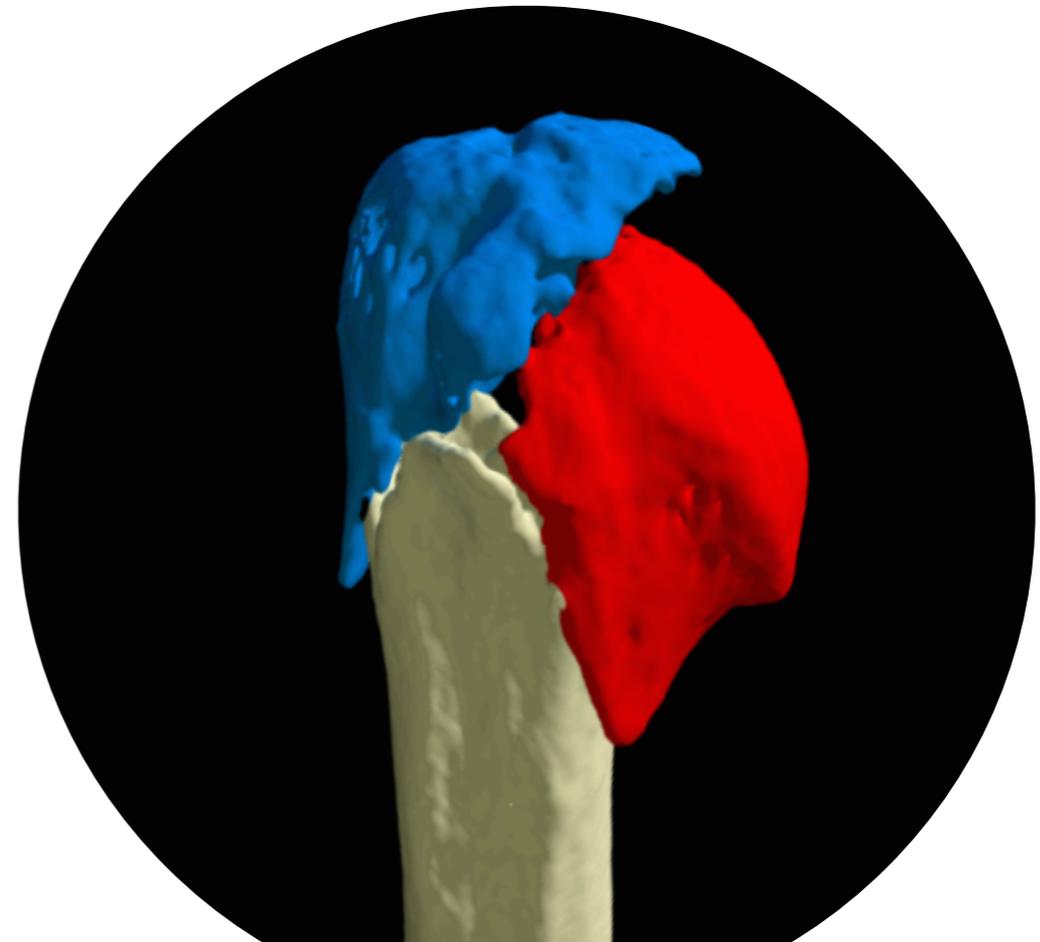


1 cm joint step

2 SPLIT HEAD FRACTURES

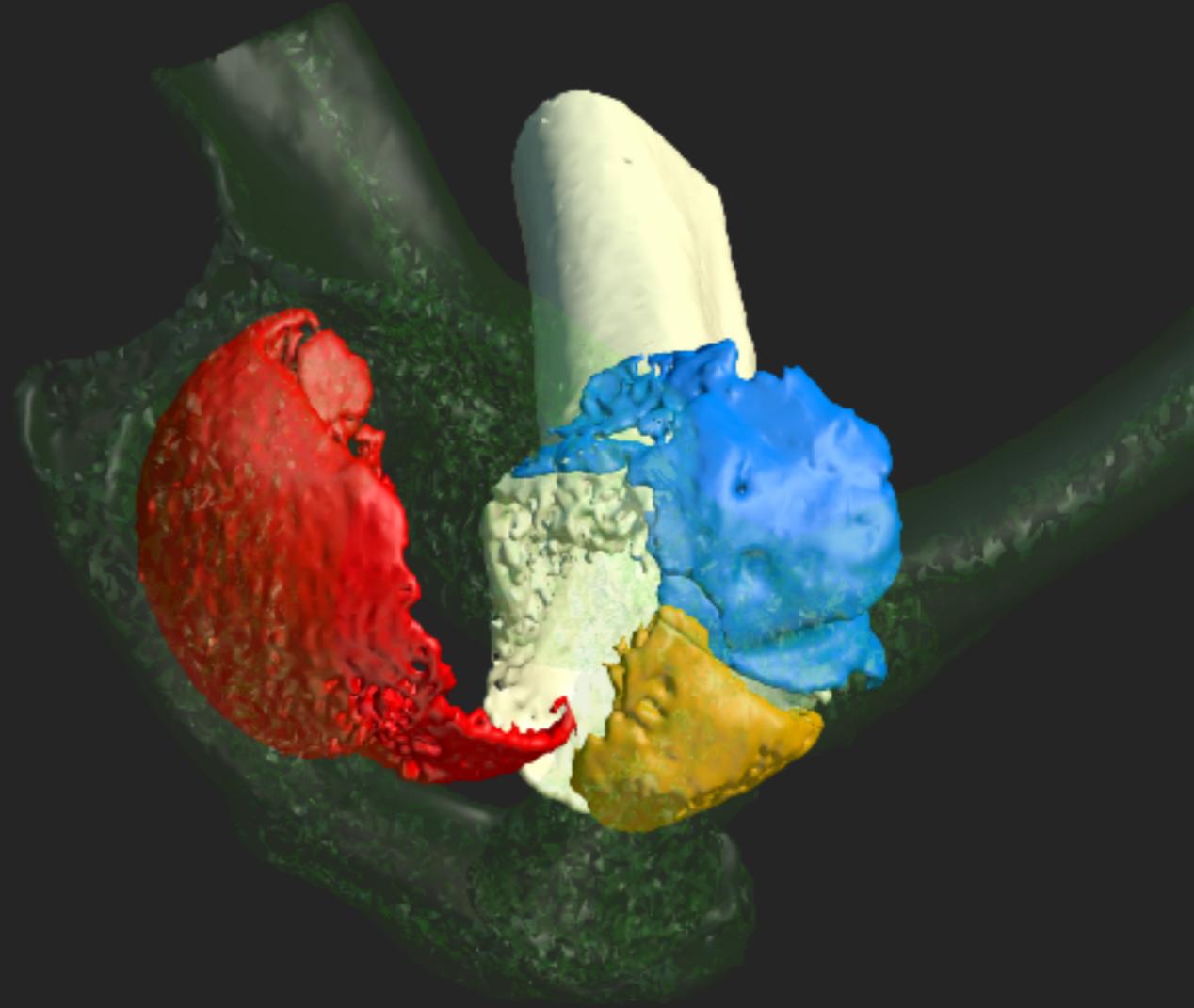
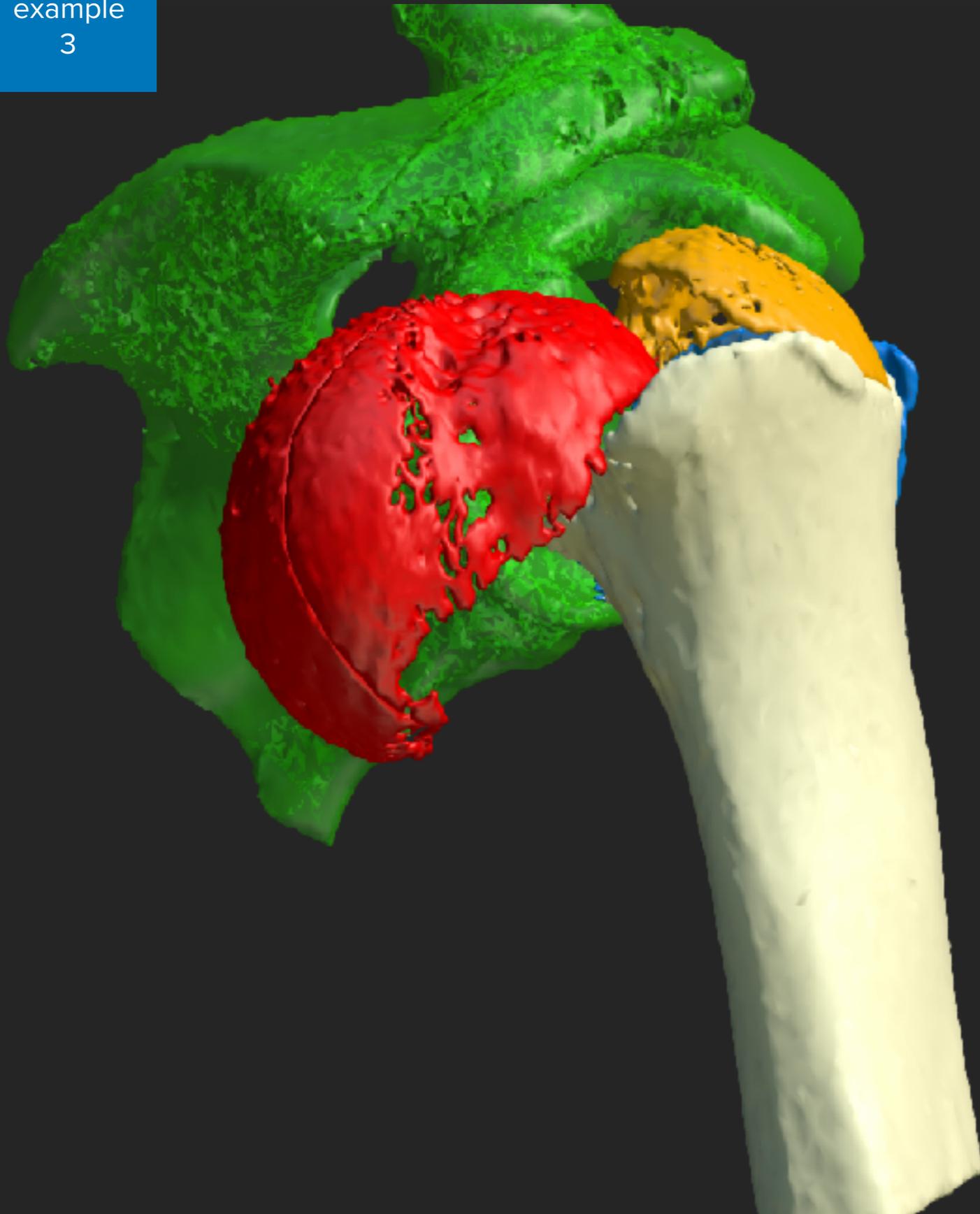


ICUC ID: 11-EA-250 / 50y



ICUC ID: 11-VD-977 / 50y

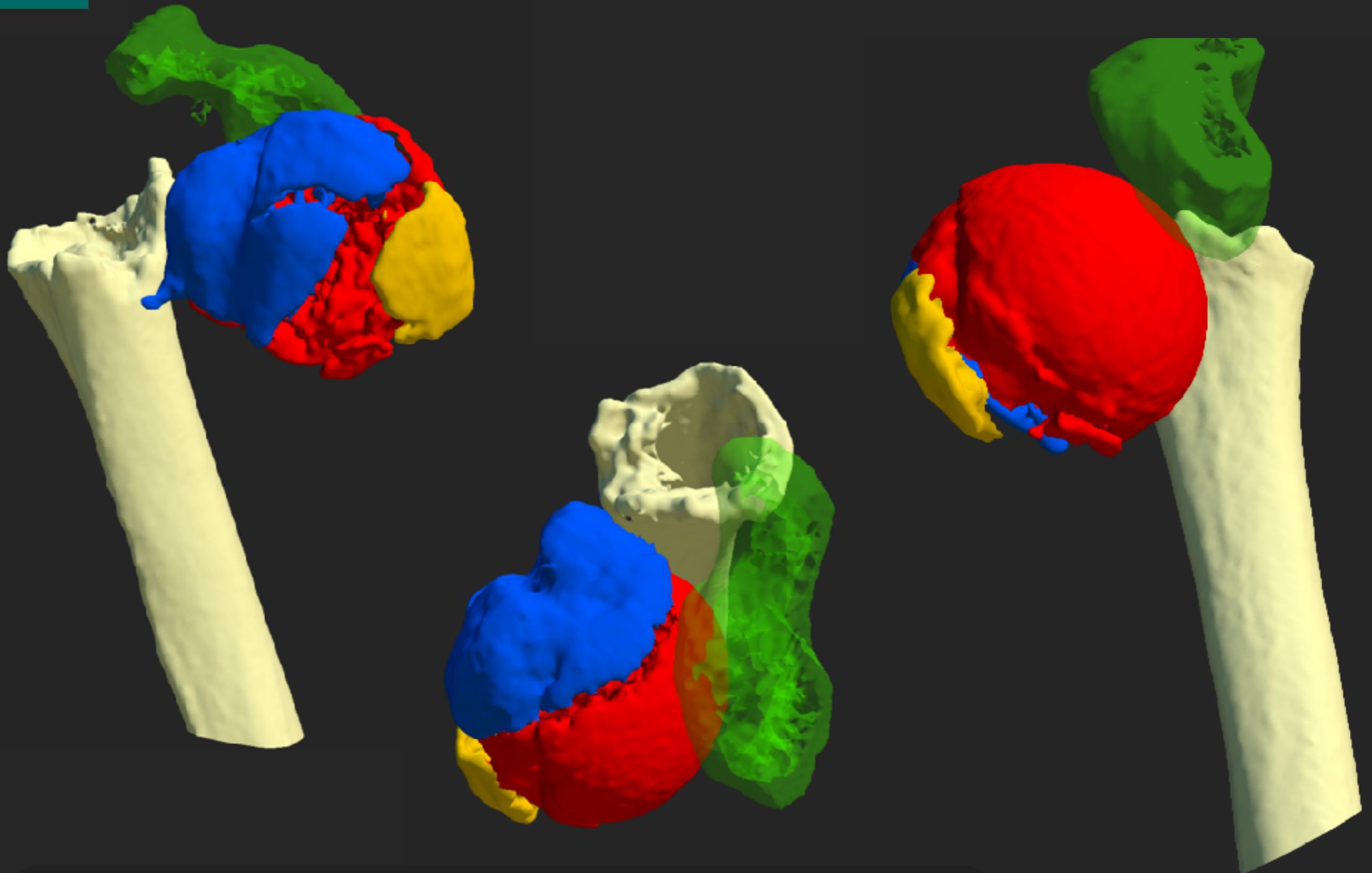
Marked difference in joint step



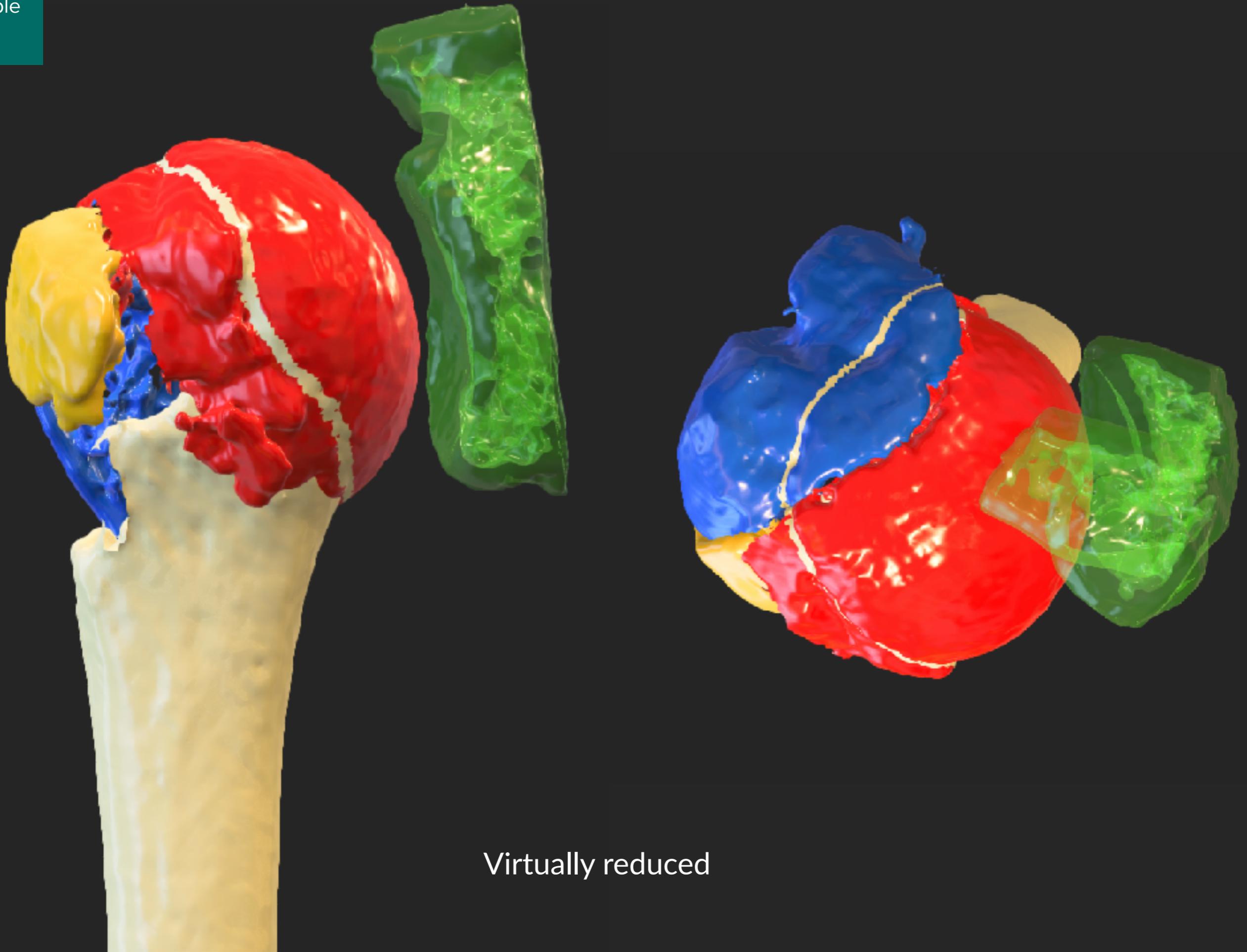
142w



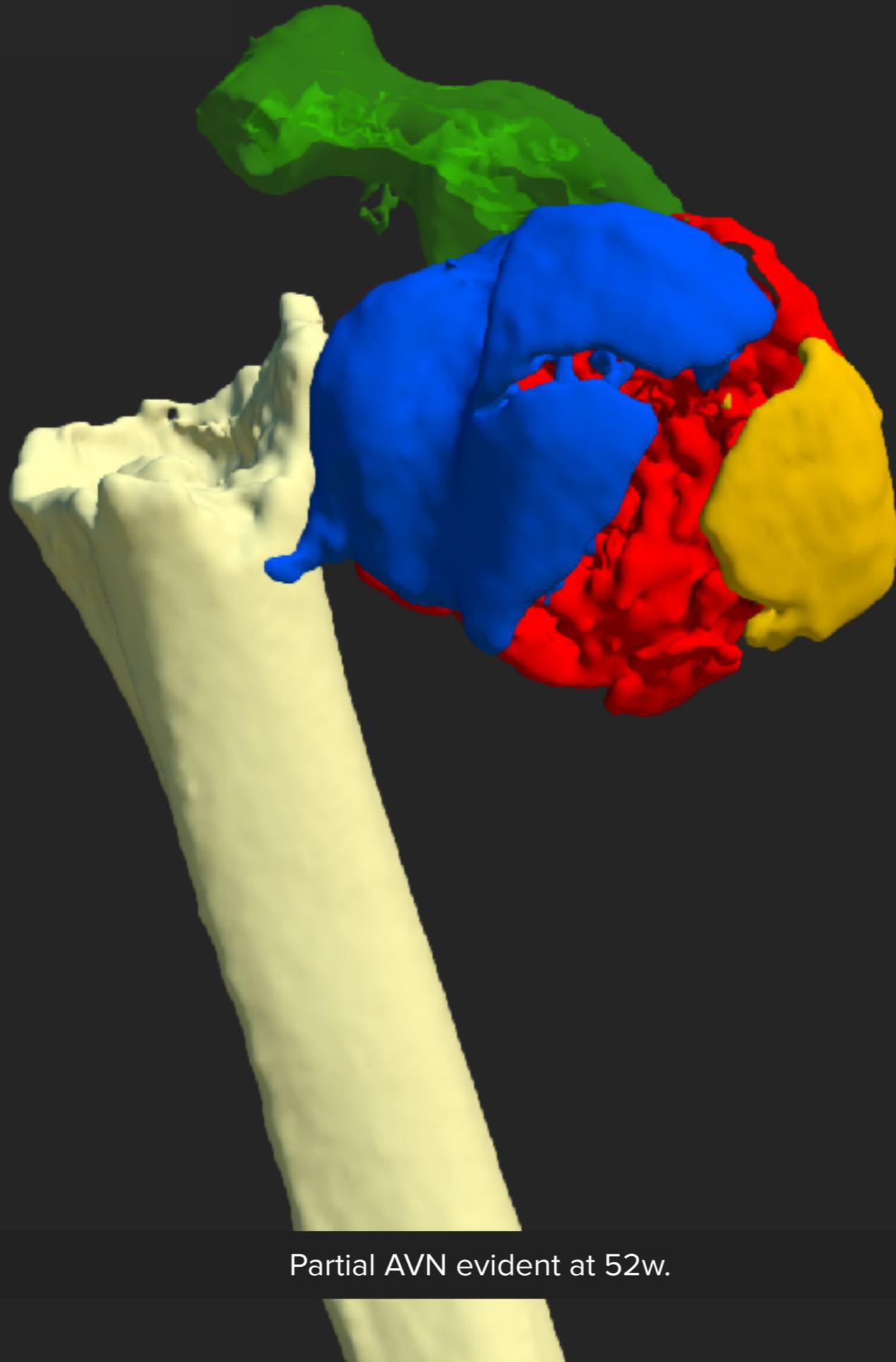
Posterior shoulder dislocation. AVN evident at 142w.



Small joint step. Marked head-shaft shift.



Virtually reduced



Partial AVN evident at 52w.

Conclusions

- Head-split fractures seems to be a very heterogeneous group
- AVN risk may vary according to the different fracture and displacement patterns found in each case
- Post-op risk either after ORIF or RSA may vary according to the different fracture and displacement patterns found in each case, and according to surgeon's skill as well.
- A joint step may be found after imperfect ORIF.
- Probably no “one-fits-all solution” will suit head-split fractures.
- May it be an idea to consider Head-split as just one more feature of a PHF?

Further reading

Guix MJM, Pedros JS, Serrano AC (2009) Updated classification system for proximal humeral fractures. *ClinMedRes* 7:32–

Hertel R, Hempfing A, Stiehler M et al (2004) Predictors of humeral head ischemia after intracapsular fracture of the proximal humerus. *JShoulderElbowSurg*13:427–433

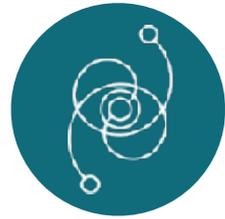
Kellam J, Audigè L (2007) Fracture classification. In: *AO Principles of fracture management*. Thieme, Stuttgart

Neer CS 2nd (1970) Displaced proximal humeral fractures. I. Classification and evaluation. *J Bone Joint Surg Am*52:1077–1089

Scheibel M, Peters P, Moro F, Moroder P. (2019) Head-split fractures of the proximal humerus. *Obere Extremität* 2019 · 14:93–102. <https://doi.org/10.1007/s11678-019-0520-6>

Shrader MW, Sanchez-Sotelo J, Sperling JW et al (2005) Understanding proximal humerus fractures: image analysis, classification, and treatment. *JShoulder ElbowSurg*14:497–505 28. Sperling JW, Cofield RH, Rowland CM (1998)

Peters PM, et al (2020) Clinical and Radiographic Outcomes after Surgical Treatment of Fractures with Head-split component. *J Bone Joint Surg Am* 2020 Jan2; 102(1):68-75. doi:10.2106/JBJS.1900320. PMID: 31596803



ICUC POSTERS

*"I have many open questions
and very few answers."*

S.M. Perren, 2019

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