3rd Biennial Arthroplasty Disaster International Conference
September 20 - September 22, 2018

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RUTGERS
New Jersey Medical School

Experience with unique options for Diaphyseal Bone Loss

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Disclosures:

- *Musculoskeletal Transplant Foundation †*
- *Merete, Implant Cast, ONKOS* †*
- *CreOsso✓*
- *Musculoskeletal Tumor Society (EC)#*

* Paid Consultant
† Research & Travel Funding
✓ Ownership, stock
\# Board of Directors

Diaphyseal Bone Loss

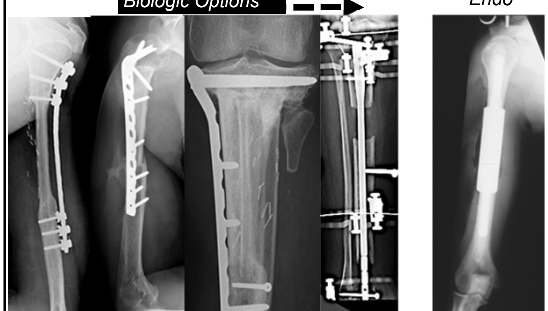
- ***Primary Malignant Tumors***
- ***Secondary (Metastatic) Tumors***
- ***Complications of Reconstruction***

Joint Sparing Resection Higher functional scores

Intercalary Resection

Biologic Options

Endo

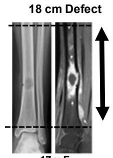


Autograft *Allograft* *Composite* *Transport* *Endoprosthesis*

Intercalary Resection

Distal Tibial Shaft lesion Peri-articular margin: Masquelet procedure

18 cm Defect



17 y F
Adamantinoma

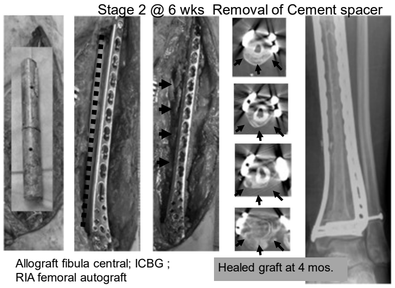
Reconstructive Options?
Bone transport?
Allograft?
VFG?
Amputation?

Stage 1 Cement spacer

Wide resection
Intaop External fixator
Osteosynthesis plates

Distal Tibial Shaft lesion peri-articular margin: Masquelet:

Stage 2 @ 6 wks Removal of Cement spacer



Allograft fibula central; ICBG ; RIA femoral autograft

Healed graft at 4 mos.

Indications for Intercalary Endoprosthesis

- Joint Sparing
- ~~Biologic Reconstruction~~
- Metastatic Disease
- Advancing Age
- Salvage of prior Reconstruction

Indications for Intercalary Endoprosthesis

- ***Failed Allografts for Primary Tumors***
- ***Metastatic & Primary Tumors in Older Patients***

VS

60 y male Adamantinoma

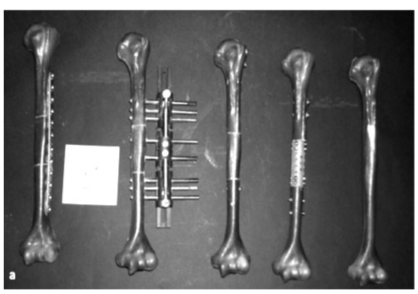
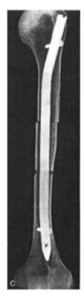
Indications for Intercalary Endoprosthesis

- ***Failed Allografts for Primary Tumors***
- ***Metastatic & Primary Tumors in Older Patients***


VS.

70 y male RCCA

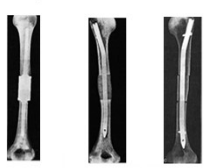
How does it compare to other methods mechanically?

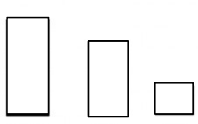



Biomechanical Analysis of Humeral Diaphyseal Segmental Defect Fixation

Jon C. Henry, MD; Timothy A. Damron, MD*; Marsha M. Weiner, BS*; Michael E. Higgins, MD*; Fred W. Werner, MME*; and Franklin H. Sim, MD***

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 396, pp. 231–239





Biomechanical Analysis of Humeral Diaphyseal Segmental Defect Fixation

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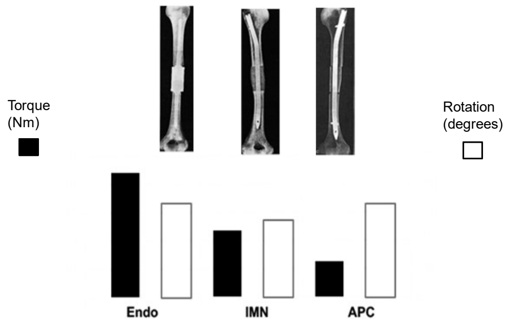
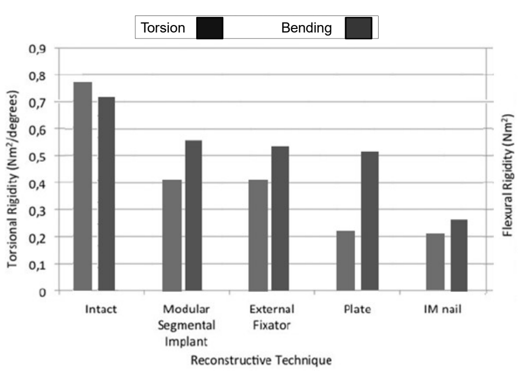
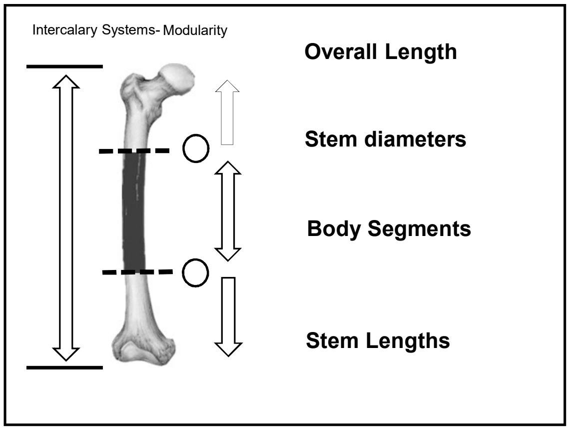


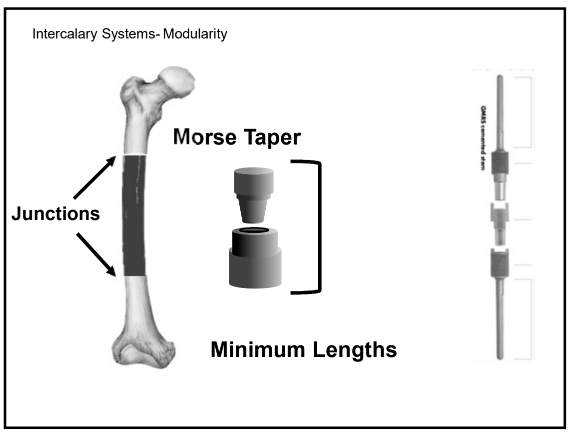
Journal of Applied Biomechanics, 2012, 28, 568-578 © 2012 Human Kinetics, Inc.

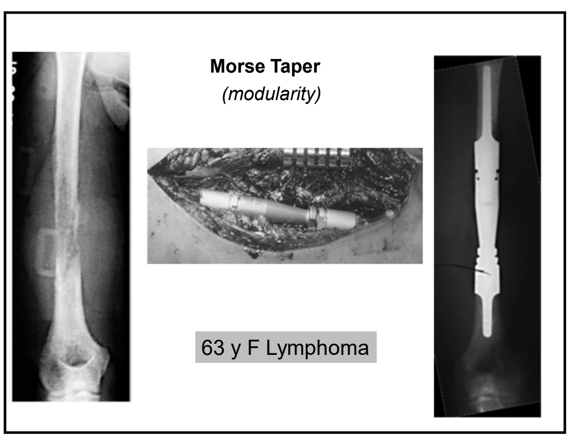
Comparison of Four Reconstructive Methods for Diaphyseal Defects of the Humerus After Tumor Resection

Vasileios I. Sakellariou,1 **Andreas F. Mavrogenis,**1 **George C. Babis,**1 **Panayiotis N. Soucacos,**1 **Evangelos A. Magnissalis,**2 **and Panayiotis J. Papagelopoulos,**1 1Athens University Medical School; 2University of Athens




Intercalary Systems- Modularity
Overall Length
Stem diameters
Body Segments
Stem Lengths


Intercalary Systems- Modularity
Morse Taper
Junctions
Minimum Lengths


Morse Taper
(modularity)
63 y F Lymphoma

Complications

Morse Taper
(modularity)

CUSTOM DEVICE

Intercalary Distractor

14% neuropraxia

Prosthetic Dissociation

63 y Woman with Solitary Lymphoma

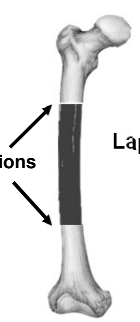
9 yrs postop

Aseptic Loosening

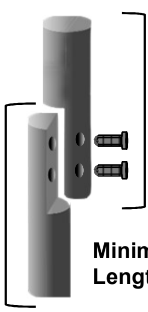
Salvage with Modular Total Elbow

Intercalary Systems- Modularity

Junctions



Lap Joint



Minimum Lengths

Stable Junction

Use of Endoprosthetic Diaphyseal Replacement: A Novel Approach to Management of Extensive Metastatic Tumor of the Midshaft Radius

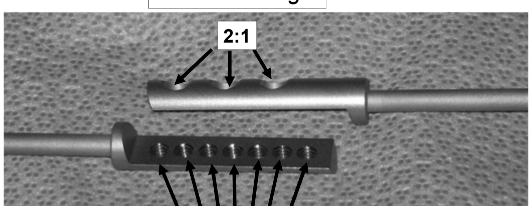
Simon Macmull, MBBS, MRCS, Kishan Gokaraju, BMedSci, MBChB, MRCS, Jonathan Miles, MBChB, FRCS (orth), Gordon W. Blunn, PhD, Steve R. Cannon, FRCS, MCh (orth), and Tim W. Briggs, MD (res), MCh (orth), FRCS

CUSTOM DEVICE

Types of Intercalary Devices

Lap Joint

Custom Design



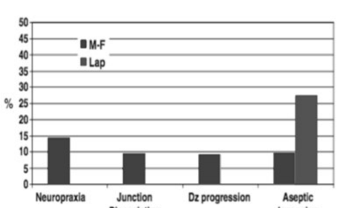
Custom Implant- variable length segments

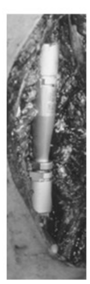
SYMPOSIUM: SELECTED PAPERS PRESENTED AT THE 2007 MEETING OF THE MUSCULOSKELETAL TUMOR SOCIETY

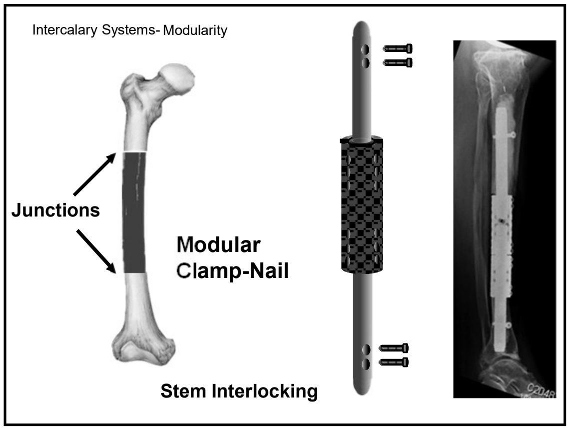
Does the Second-generation Intercalary Humeral Spacer Improve on the First?

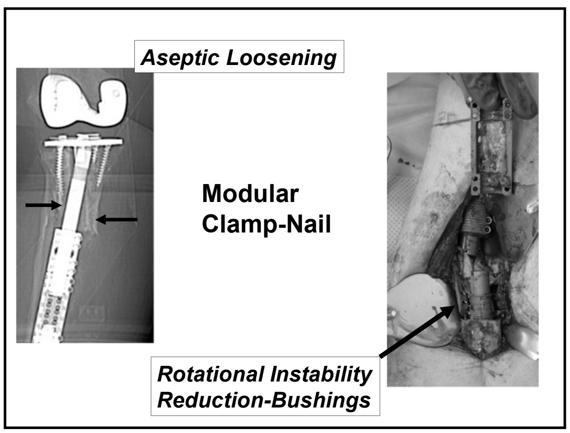
Clin Orthop Relat Res (2008) 466:1309–1317

Timothy A. Damron MD, Taninnit Leerapun MD, Ronald R. Hugate MD, Thomas C. Shives MD, Franklin H. Sim MD









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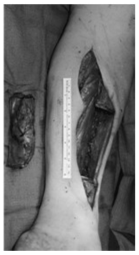
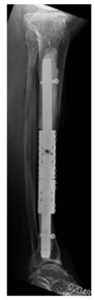
	Initial Tumor Procedure	*Revision Previous Surgery*	
Primary	10	4	14
Metastatic	22	4	26
Total	32	8	40



Defect size (cm)	
Femur	9.7
Tibia	10.6
Humerus	6.3



Complications

Type 1	*Soft-Tissue Failure*	*Type 4*	*Deep Infection*
Type 2	*Aseptic Loosening/Nonunion*	*Type 5*	*Tumor Progression*
Type 3	*Structural Failure*		

Location	Complications: University Hospital					Total
	Type 2	Type 3		Type 4	Type 5	
		a	b			
Femur		5		1		6
Tibia	3				1	4
Humerus	1				1	2
						12

ISOLS-MSTS F(x) = 74 %

Location	F(x)
Femur	73%
Tibia	73%
Humerus	83%

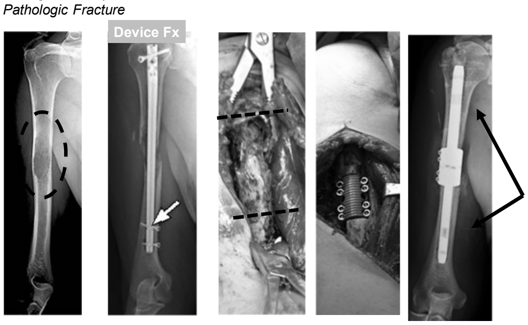
F/U = 24 m (1-100)

Complications

Published Studies

Prosthesis	# pts	Soft-Tissue Failure (Type 1)	Aseptic Loosening (Type 2)	Structural Failure (Type 3)	Infectious Comp. (Type 4)	Tumor Prog. (Type 5)	# Comp.
Birmingham	35	0	7 (20%)	3 (8%)	1 (3%)	19 (54%)	30 (85%)
Aldyami 2005							
Stryker 1st generation	20	0	2 (10%)	0	0	2 (10%)	4 (20%)
Stryker 2nd generation	12		3(25%)			0	3 (25%)
Damron 2008							
Stanmore	54	0	9 (16%)	7 (13%)	2 (4%)	16 (30%)	34 (63%)
Hanna 2010, McGrath 2011, Sewell 2011							
Osteobridge	87	0	13 (15%)	9 (10%)	2 (3%)	2 (3%)	26 (30%)
Ruggieri 2011, Benevenia 2016, Current Series							

Salvage of complication after IM Nail Treatment of Pathologic Fracture

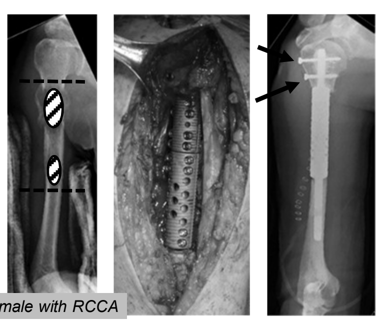


60 y M myeloma

Locked IM Nail

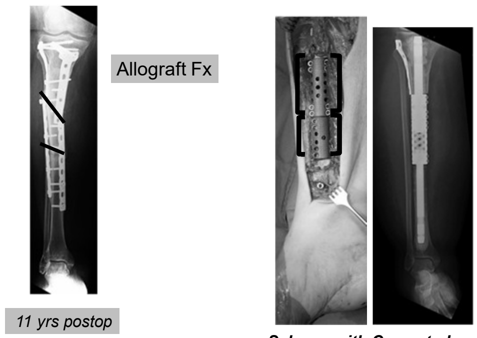
Osteobridge *with PMMA modular nails different diameters Interlocking screws not necessary*

Humerus



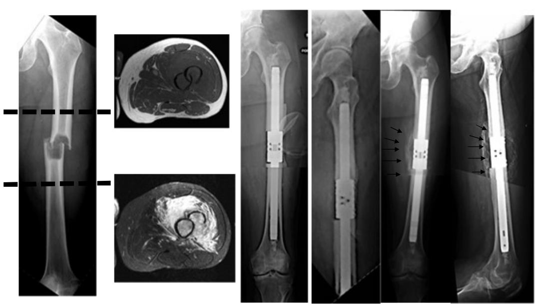
70y male with RCCA

46 y female s/p Adamantinoma



Salvage with Cemented Intercalary Endo

Intercalary Resection for Pathologic Fracture RCCA



Conclusions

Cemented Implants:

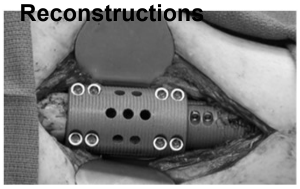
<u>*Higher F(x) scores*</u> **80% vs. 66%* *(p<0.05)***

<u>*Lower complication rates*</u> **20% vs. 36%**

Femoral Reconstructions

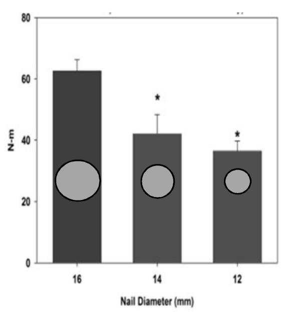
Associated with the highest complications **(p<0.001)**

Femoral Reconstructions

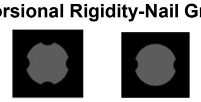


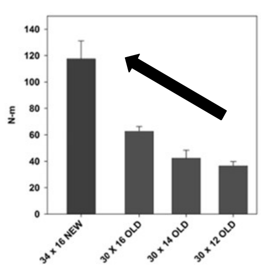
Anti-rotation plates and 34 mm body spacers with 16mm Nails.

Torsional Rigidity-Nail Diameter



Torsional Rigidity-Nail Grooves

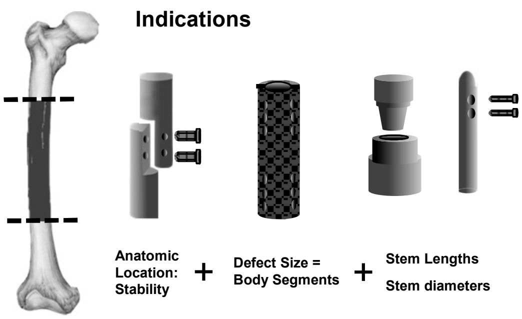
4  2



NON-FDA APPROVED

Intercalary Systems- Summary

Indications



THANK YOU !

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