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RESEARCH GOALS:

1. To explore possible pathophysiologic mechanisms involved in the development of osteonecrosis (ON) and osteoporosis.
2. To define different factors (implant, surgeon, and patient related) which may affect the long-term success of THR or TKR.
3. To evaluate the use of bone graft materials and substitutes and possibly mesenchymal stem cells in different orthopaedic applications.

RESEARCH SUMMARY AND SIGNIFICANCE: Our study of the pathogenesis of ON involves clinical and basic science research. We have found a higher # of coagulation factor abnormalities in ON patients compared to controls. We have characterized specific models of ON that simulate certain aspects of the disease. Numerous factors which may affect the long-term success of THR or TKR have been examined (e.g., diseases, age, surgical procedures, implant design). We have also evaluated different biomaterials (TCP, TCS, HA, gels), modulators (BMP-2, BMP-7), and processing (demineralization) for use as bone graft materials.

FUTURE DIRECTIONS/AVAILABLE RESEARCH PROJECTS: We have a large number of clinical and basic science research projects that have been proposed, a list of which is available upon request. Examples include:

1. TKR in osteonecrosis – stemmed versus non-stemmed implants
2. Effect of THR on bone remodeling of femur due to aging
3. Use of bone marrow cells in treatment of osteonecrosis

RECENT PUBLICATIONS:

1. Jones, L.C., Mont, M.A., Le, T.B.*, Petri, M., Hungerford, D.S., Wang, P., and Glueck, C.J. Procoagulants and Osteonecrosis. *J Rheumatol* 2003; 30:783-91. * Resident
2. Jones, L.C., Frondoza, C., Hungerford, D.S.: The Effect of PMMA Particles and Movement on an Implant Interface in a Canine Model. *Journal of Bone and Joint Surgery (Br)* 2001; 83-B(3): 448-458.
3. Cova, M.; Kang, Y.S.; Tsukamoto, H.; Jones, L.C.; McVeigh, E.; Neff, B.L.; Herold, C.J.; Scott, W.W.; Hungerford, D.S.; Zerhouni, E.A.: Bone Marrow Perfusion Evaluated with Gadolinium-enhanced Dynamic Fact MR Imaging in a Dog Model. *Radiology* 1991; 179(2):535-539.

PAST RESIDENT RESEARCH PROJECTS:

1. Mears, S.C.*, Bawa, M., Pietryak, P., Jones, L.C., Rajadhyaksha, A.D., Hungerford, D.S., Mont, M.A. Coding of Diagnoses, Comorbidities and Complications of Total Hip Arthroplasty. *Clin Orthop*. 2002; 402:164-70. *resident
2. LaPorte, D.M.*; Mont, M.A.; Mohan, V.; Pierre-Jacques, H.; Jones, L.C.; Hungerford, D.S.: Osteonecrosis of the Humeral Head Treated by Core Decompression. *Clinical Orthopaedics and Related Research* 355: 254-260, 1998. * resident