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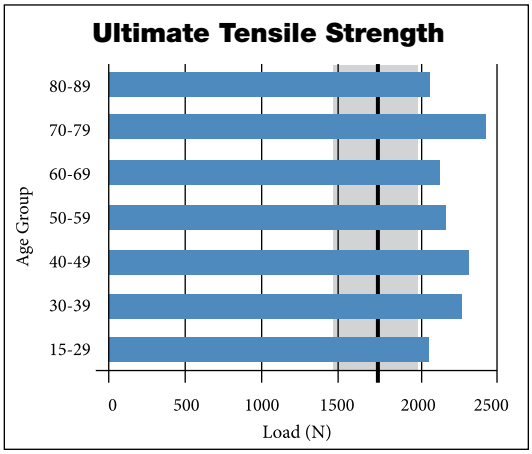
Joint Preservation

LITERATURE MATTERS
RESEARCH BULLETIN

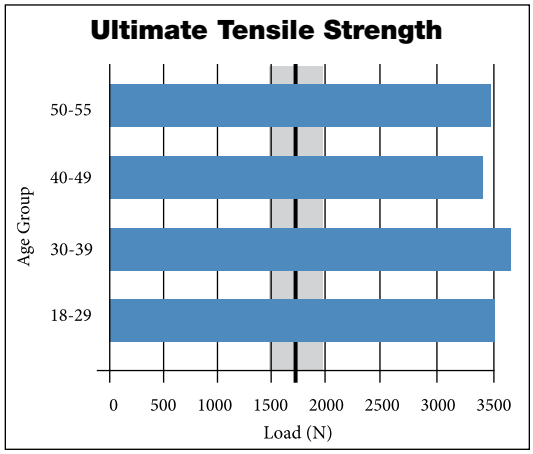
ALLOGRAFT DONOR AGE: DOES IT REALLY MATTER?

Review of the Relevant Literature

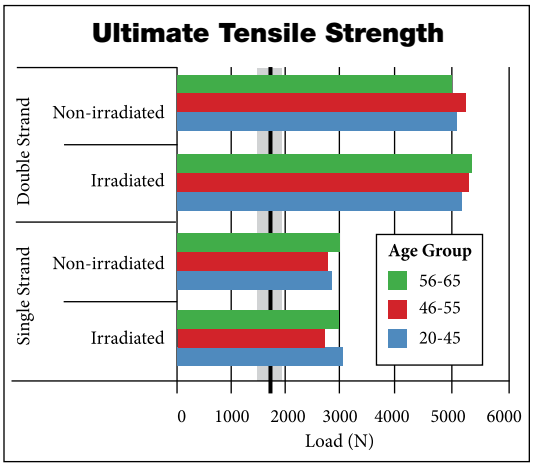
Three studies tested allografts, both soft tissue and BTB and processed with different sterilization methods. All demonstrated that donor age has no statistically significant effect on the ultimate tensile strength. The native ACL has been shown to have a tensile strength of 1725 ± 269N.[1] In the graphs below this is shown as a black line (average) and gray box (standard deviation).



Anterior tibialis tendons (n=526) sterilized with BioCleanse.[2]



Fresh frozen bone-patellar tendon-bone allografts (n=33)[3] aseptically recovered (not sterile).



Anterior and posterior tibialis tendons – fresh frozen and treated with Allowash (n=126).[4] Irradiated group dose: 1.46-1.80 Mrad (14.6-18.0 kGy). Others have shown that low dose gamma irradiation does not negatively influence allograft strength.[5]

CLINICAL CONFIRMATION

The mechanical data presented above has also been confirmed clinically. Hampton et al reported on 75 patients who underwent primary ACL reconstruction with fresh-frozen BTB allografts at a minimum of 10 months follow-up. The average donor age was 44.6 ± 15.2 years with 32% female donors and 68% male. **There was no statistically significant effect of either donor age or donor sex on Tegner or Lysholm scores.[6]**

Both benchtop testing of soft tissue and BTB allografts and a retrospective clinical assessment of patients receiving BTB allografts support the conclusion that donor age has no significant effect on outcomes.

References:
1. Noyes et al "Biomechanical analysis of human ligament grafts used in knee-ligament repairs and reconstructions" *JBJS* 66, 344-352, 1984.

2. Pedroso and Myrick "Effect of Age on the Mechanical Properties of Human Anterior Tibialis Tendons Sterilized Through the BioCleanse® Process" RTI Biologics lit. # 6072 R0 6-25-10.

3. Flahiff et al "Biomechanical Analysis of Patellar Tendon Allografts as a Function of Donor Age" ***AJSM*** 23(3) 354-358, 1995.

4. Greaves et al "The Effect of Donor Age and Low-Dose Gamma Irradiation on the Initial Biomechanical Properties of Human Tibialis Tendon Allografts" *AJSM* 36(7) 1358-1366, 2008.

5. Samsell and Moore "Use of controlled low dose gamma irradiation to sterilize allograft tendons for ACL reconstruction: biomechanical and clinical perspective" *Cell Tissue Bank* 13:217–223, 2012.

6. Hampton et al "Effect of Donor Age on Patellar Tendon Allograft ACL Reconstruction" *Orthopedics* 35(8) e1173-e1176, 2012.

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ALLOGI-TB-1 Rev. 1

Printed in USA