AOUK statement

Major Johno Breeze RAMC
ST4 Registrar in Oral and Maxillofacial Surgery
Queen Elizabeth Hospital Birmingham

Storage of porcine tissues in different conditions does not alter the depth of penetration produced by fragment simulating projectiles

Explosively propelled fragments are the most common cause of injury to UK service personnel in modern conflicts. Injury models that accurately predict how these injuries occur are required to compare the effectiveness of future designs of body armour. Traditionally models have been based upon tissue simulants and animal surrogates but the recent availability of Post Mortem Human Subjects (PMHS) may improve predictions through their more similar anatomy. However tissue changes that occur post mortem as well as storage conditions used to preserve the specimens may potentially alter their properties. The aim of this research was to ascertain whether the depth of penetration (DoP) produced by representative fragment simulating projectiles (FSPs) at varying velocities changed between animal tissues stored in different conditions compared to a validated tissue simulant. Three types of FSPs were fired at eight fresh pig thighs, eight pig thighs refrigerated for 1 week at 4 degrees Celcius and eight pig thighs frozen at -10 degrees for 8 days and refrigerated for 4 days and 8 blocks of 20% ballistic gelatin. No significant difference was found in the DoP between the differently stored pig tissue ($p<0.05$) but there was a significant difference between pig tissue and gelatin ($p= 0.32$). It is therefore postulated that PMHS subjects stored in the manners above would not significantly differ from fresh human skin and muscle and may therefore be used to predict the effect of these projectiles penetrating live human tissue.

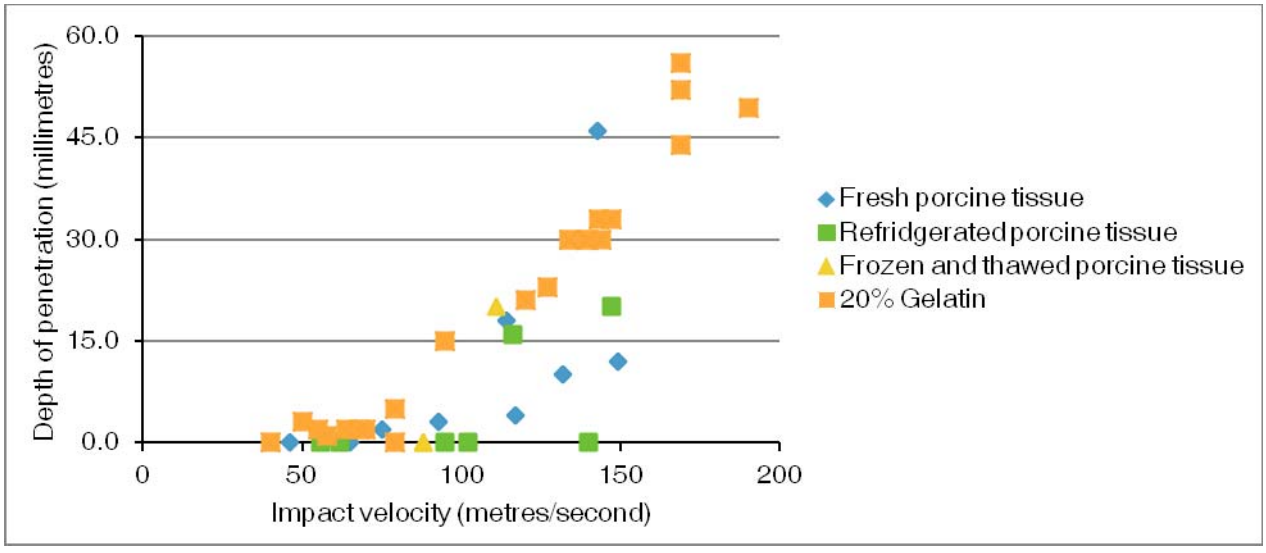

Figure 1: A graphical plot demonstrating that the Depth of Penetration produced by 0.51gram spherical fragment simulating projectiles fired into porcine tissues at varying impact velocities is not affected by storage conditions.