INTRODUCTION
The Knee meniscus is a fibrocartilage tissue situated between the condyles of the femur and the tibial plateaus. Meniscal functions include load-sharing, shock absorption, joint stability, joint nutrition and overall protection of the articular cartilage [1]. Meniscal injuries are the most frequent injury making up to 14% to 16% of all musculoskeletal injuries at the knee [2]. A damaged meniscus can prevent the knee from flexing properly and is very painful. Partial or complete removal of the meniscus can alleviate the problem, in the short term. However, it usually leads to osteoarthritis. Of all the existing meniscus replacements, none has been satisfactory. A new composite is proposed as a meniscal replacement having comparable mechanical properties to the native meniscus.

METHODS
A medium term grade Silastic® silicone elastomer Q7-4780 (Dow Corning Ltd, Coventry, CV5 9RG, UK) was used as the polymeric matrix while a 0.6 mm diameter standard monofilament nylon fishing lines (Fosters of Birmingham, Unit K, Moor Lane, Witton Birmingham, B6 7HH, UK) were used as the reinforcing fibres. A mould was designed such that the fibres can be pulled through horizontally at equal intervals as well as being held in tension. The silicone material which was supplied in two parts, A and B were mixed together in a ratio of 1:1 on a water-cooled twin-roll milling machine (Winkworth Machinery Ltd, UK). After carefully arranged a 0.3% fibres in the mould, the mixed silicone was then used to fill up spaces in the mould until it was full. The mould was then placed between two steel plates. Rectangular (153 X 19 X 6 mm) shaped specimens for tensile testing, were then pressed in a pre-heated hydraulic press at 116°C for 3 hours and cooled for about 24 hours before being removed from the moulds.

The samples were sliced through and examined under the FEI XL-30 FEG model environmental scanning electron microscope (ESEM) to examine how the nylon fibres were held in the silicone matrix.

RESULTS AND DISCUSSION
Tensile Tests were done using Instron 5848 MicroTester (High Wycombe, United Kingdom) with a load cell of 200N at a cross head speed of 12mm/min. The plots of the stress versus strain are as shown in Figure 1. As a result of the non-linearity of the stress-strain curve, a tangent modulus value at a strain rate of 2% was used to characterize the composite stiffness. The tangent modulus was found to be 90 MPa. This is within the circumferential modulus for the native meniscus which is between 70 and130 MPa [3,4,5]. Figure 2 is the micrographs of the sliced samples when cut through at an angle of 90° and 45° shows the arrangement of the fibres in the matrix and how they are being held in position.

Figure 1: Stress-Strain plots of the tensile tests
Figure 2: Micrographs of the composite (a) Looking through the specimen when sliced at 45°C (b) Looking at the surface of the normally sliced specimen
CONCLUSIONS
The modulus obtained from the tensile tests showed that the composite material is well suitable for a meniscus replacement. The curve of the stress-strain graph showed an elastic behaviour similar to the natural meniscus tissue. The developed composite therefore require other mechanical testing such as compression, wear and friction to further ascertain its suitability for the meniscus replacement.

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