INTRODUCTION
Bone is a natural composite comprising a hard mineral phase and a more compliant organic network (90% collagen). Effects of the mineral phase on bone biomechanical properties have been extensively studied in the past. However, little is known regarding how much the organic phase would contribute to bone biomechanical integrity even though some studies reported that the integrity of collagen network correlates with bone mechanical properties. Changes in collagen network may occur at different levels: denaturation of collagen molecules (unwinding and cleavage of triple helix); intermolecular crosslinks; collagen fibers; and finally the architecture of the collagen network. Changes in collagen network may occur at different levels: denaturation of collagen molecules (unwinding and cleavage of triple helix); intermolecular crosslinks; collagen fibers; and finally the architecture of the collagen network (unwinding and cleavage of triple helix).

MATERIALS AND METHODS
A young adult bovine femur was obtained from a local abattoir. A total of sixty bone samples were obtained from mid-diaphysis of the femur. Since both plexiform and Haversian bone may exist in the bovine femur, a precaution was taken to ensure that only plexiform bone was used. These bone samples were randomly divided into five groups for the heat treatment at different temperatures. The bone samples were then tested in an Instron test machine in a standard three-point bending test. The bending test and data processing followed the ASTM standard. Meanwhile, another 36 bone specimens (10 x 4 x 2 mm) were prepared for mechanical testing, and were machined to a dimension of 30 x 4 x 2 mm in length, width, and height, respectively. These bone samples were randomly divided into five groups for the heat treatment at different temperatures (n=6). From these groups, one was maintained without heating (room temperature). Another two groups were heated at 150°C and 200°C (p<0.05). Such changes correlated significantly with variations in the amount of denatured collagen. In addition, the stiffness (E) of bone samples treated over 150°C exhibited more than 90% denatured collagen. These significant differences were found in densities and volume fractions for both mineral and organic phases of the bone specimens treated at all test temperatures.

![Figure 1: Effects of heat treatment on bone properties](image)

**REFERENCES:**
5. TNO Prevention and Health, Division of Vascular- & Connective Tissue Research, P.O.Box 2251, 2301 CE Leiden, The Netherlands.