Poster#1434

Novel material for mouth guard composed of two materials

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Introduction

The use of mouth guards can reduce the incidence and severity of sports-related oral injuries by providing a resilient and protective surface to distribute and dissipate transmitted forces on impact. Although ethylene vinyl acetate (EVA) material has become widely accepted as a mouth guard material, many studies indicate the necessity of improving the impact absorption ability of mouth guards by considering the design and developing new materials.

Recently, a porous rubber(Fig. 1 Representative SEM image of Saporus & sample) is remarkable as shock-absorbent. It is already used as “Various insoles(High shock-absorbent)”, “Hip protectors for care goods(High shock-absorbent)” and “Earplugs for the swimming(waterproof).

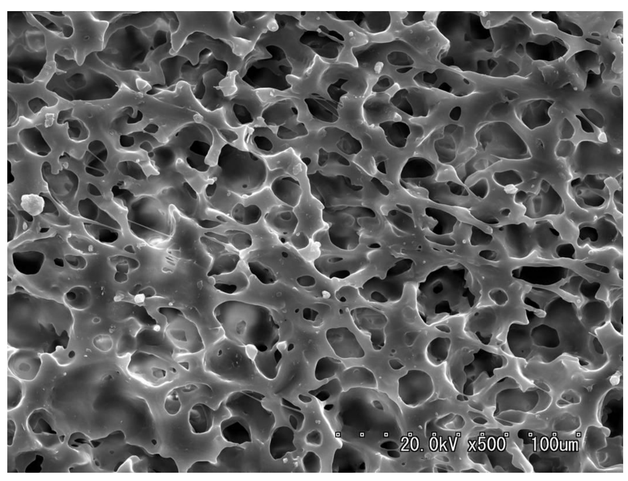


Fig. 1 Representative SEM image of Saporus & sample

We fabricated a novel material for mouth guards composed of two materials; EVA and porous rubber.

Purpose of the study

The aim of this study was to compare the shock-absorbing ability of novel material with that of EVA.

Methods

Three group of samples were tested:

Group1 = EVA,

Group2 = type 1 material (2-mm thick porous rubber sheet sandwiched between two sheets of 1-mm thick EVA sheets), and

Group3 = type 2 material (1-mm thick porous rubber sheet sandwiched between EVA sheets with 1 and 2-mm thickness respectively)(fig.2).

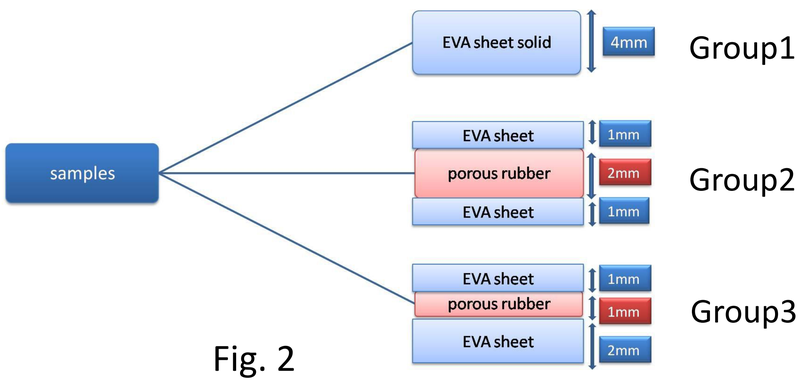


Fig. 2

Shock absorption was determined by means of a hammer impact testing device equipped with strain gauge, accelerator, and load cell (NEC OMNIACE2 RA1200 TYPE-504-CA-4)(Fig.3). Values of shock-absorbing ability were calculated as follows:

Shock-absorbing ability (%) = (maximum acceleration of blank – maximum acceleration of sample) / maximum acceleration of blank × 100.

The values were shown as mean±SD. Statistical analysis was performed by One way Analysis of Variance test with LSD post-hot multiple comparison.

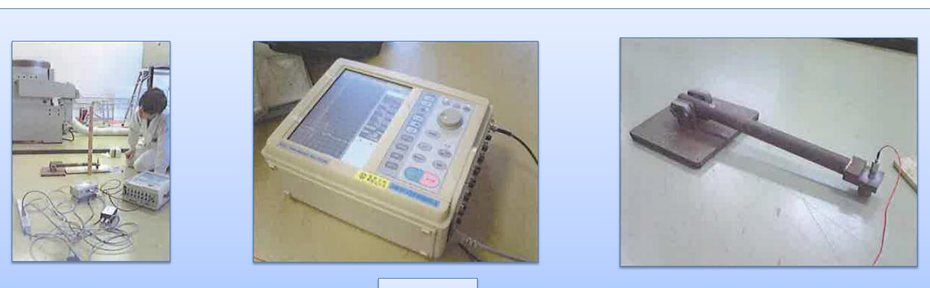
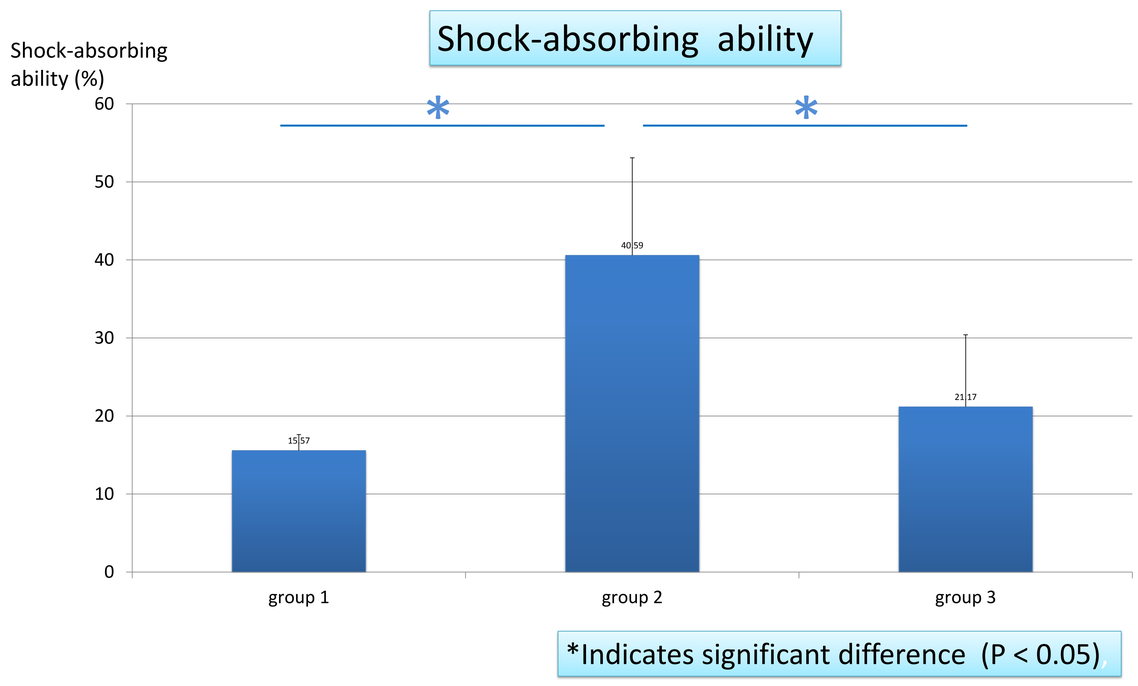


Fig. 3

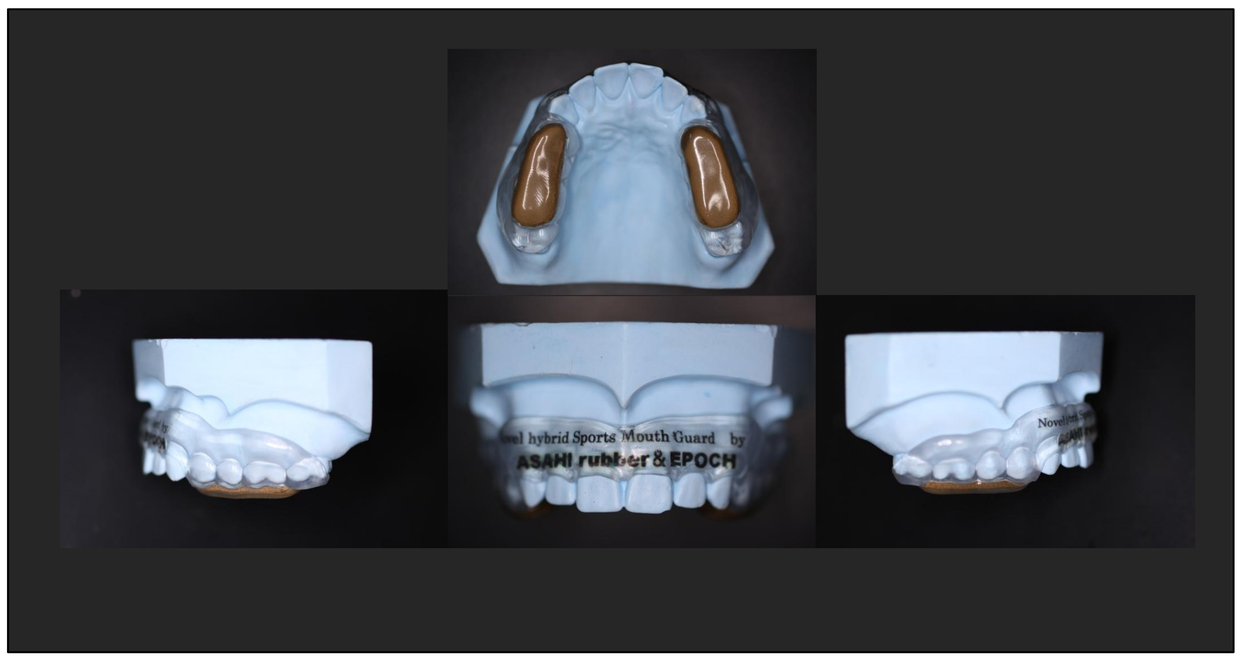
Results

The value of shock-absorbing ability of group 2 (40.59±12.5%S) was significantly higher than those of group 1 and group 3 (15.57±2.05% and 21.17±9.23%) . The material with thicker rubber sheet showed significantly higher shock-absorbing ability compared with that of the material with thinner rubber sheet.



Conclusion

Our novel material was superior to conventional EVA material in shock-absorbing ability depending on the thickness of porous rubber and it may be potentially effective as mouth guard material.



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