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CL10 - ORTHODONTIC LOADING OF TWO DIFFERENT MINISCREW IMPLANTS IN YOUNG PIGS : PRELIMINARY RESULTS

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KEY WORDS
Bone, Miniscrews, Stainless steel, Ti6Al4V, Histomorphometry, Micro-CT

INTRODUCTION
The miniscrew implants are increasingly used over the last decade in orthodontics and gradually replacing the use of extraoral forces because of their greater efficiency and because their effectiveness is not subject to patient compliance. Few studies seeking to understand the response to orthodontic anchorage devices at bone-tissue interface have been published over the last ten years. Despite the large use of miniscrews in teenagers, very few have included young subjects in their protocol. Furthermore, despite the use of stainless steel miniscrew implants, no studies have investigated biointegration of such devices. The aim of the present study was to evaluate tissue response to immediately loaded miniscrew implants (of Ti6Al4V and of stainless steel) in growing pigs.

MATERIALS AND METHODS
16 Ti-6Al-4Va alloy miniscrew implants and 16 stainless steel miniscrew implants were inserted in the mandible of eight 3-month-old pigs, and immediately loaded with a force of 1N during a 4 week-period and a 12 week-period. Each animal had two titanium allow and two stainless steel devices inserted. Plaque control was carried out twice weekly. Survival rate, devices mobility and osseointegration were studied. The protocol was approved by the ethics committee on animal research of the National Veterinary School of Lyon.

PRELIMINARY RESULTS
After a 4 week-period, all miniscrews were present in the mandible except 2 devices of Ti6Al4V (survival rate of 100% and 75% for stainless steel and Ti6Al4V, respectively). After a 12 week-period, 5 devices of stainless steel on 8 (62.5%) were present in the mandible and 4 devices of Ti6Al4V (50%). All miniscrew implants were non-mobile after 12 weeks, despite mobility during the study period for more than 55% of these devices. Osseointegration was not performed as there was fibrous tissue between the screw thread and the bone tissue. The rate of bone-to-metal contact varied from 0 to 13,55% for the devices of stainless steel and from 0 to 36,14% for the devices of Ti6Al4V, whatever the loading-period and the mobility may be.

DISCUSSION AND CONCLUSIONS
The growing bone seems compatible with the orthodontic anchorage (for the study periods). Half of the devices were mobile during the study period (both kind of devices) but stabilization occured before the end of the study (12 weeks after insertion and loading), despite a low bone-to-implant contact. In our study, stainless steel devices presented similar behavior to the Ti6Al4V devices in pigs.