ULTRASONIC SENSOR WITH ADJUSTABLE PROTECTIVE COVER FOR THE DENTAL APPROXIMAL REGION

Ref-No: TA-PVA11227

BACKGROUND

In contrast to X-ray imaging, ultrasonic imaging procedures do not use spare ionizing radiation. Instead, an analysis of the signal delay is conducted to describe the structure of the teeth three-dimensionally. The piezoelectric effect of active elements is used to generate acoustic and elastodynamic waves. These waves collide with the examined material and are reflected into the opposite direction where they will be received and translated into electric signals to form the final image.

PROBLEM

A fundamental difficulty of practical ultrasonic examination of teeth is given in the large distance from sensors placed on the occlusal surface or teeth-sides to the approximal region (space between two teeth). Consequently, strong signal attenuation occurs leading to a reduced spatial resolution as well as errors in the measurement of acoustic impedance, velocity and attenuation which may finally affects the total usability diagnosis. Because of the small gap between two teeth it is hard to make a proper diagnosis even though using a modern x-ray method.

SOLUTION

Based on a very thin, high-strength design of the invention the ultrasonic sensor is placed between the teeth of the approximal region, thus reducing the distance significantly. As a result the images posses a very high spatial resolution. The ultrasonic sensor consists of a metallic base plate with a reinforced frame, made of high-strength pure titanium or a TiAl6V4 alloy. The edges of the frame are rounded to make the insertion in the approximal region more comfortable. The total thickness of the design is limited to a maximum of 0.8 mm. The piezoelectric part is made on a PVDF-film equipped with spacers and shielded by an adjustable cover. The cover allows for a special contact by respecting the safety clearance to the teeth. By removing the cover hydrogel is pumped into the gap to provide acoustic coupling. In addition, it is used for lubrication of the covermovement.

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DEVELOPMENT STATUS

Concept

PATENT SITUATION

DE 10 2013 112 078 granted

CATEGORIES

//Diagnostics //Dentistry //Medical devices //Medical imaging
ADVANTAGES

- High spatial resolution images of the approximal region
- High-strength, thin sensor for placement between two teeth
- Safe and practical handling

SCOPE OF APPLICATION

- Sensor technology
- Medical imaging

SERVICE

- Disposition
- Concession agreement
- Development cooperation