CLAIMS

1. A testing method for determining an oral indicator, the testing method comprising:

an image acquisition step of acquiring an ultrasonic image of an inside of an attached gingiva of a subject, using a measurement probe;

an average brightness acquisition step of acquiring average brightness of a region of the inside of the attached gingiva in the ultrasonic image; and

an indicator determination step of determining an oral indicator of the subject by referring to the average brightness and a reference of the oral indicator,

wherein the region of the inside of the attached gingiva of which the ultrasonic image is acquired is at least a part of a range from immediately below epithelium to 1500 μm below epithelium-connective tissue border.

2. The testing method according to claim 1, wherein a tip end of the measurement probe for measuring a surface of the attached gingiva has a diameter of 0.1 to 5 mm.

3. The testing method according to claim 1 or 2, wherein the region of the inside of the attached gingiva of which the ultrasonic image is acquired is at least a part of a range from immediately below epithelium to 800 μm below epithelium-connective tissue border.

4. The testing method according to any one of claims 1 to 3, wherein an acquisition range of the ultrasonic image has an area equal to or smaller than 20 mm^2.

5. The testing method according to any one of claims 1 to 4, wherein the image acquisition step is a step of

acquiring the ultrasonic image with ultrasound having a radiation wavelength of 10 to 50 MHz.

6. The testing method according to any one of claims 1 to 5, wherein the reference is previously-acquired average brightness associated with the oral indicator.

7. The testing method according to any one of claims 1 to 5, wherein the reference is a statistical regression formula of the oral indicator.

8. A method of evaluating a gum care product, the method comprising:

using a measurement probe, acquiring an ultrasonic image of an inside of an attached gingiva of a subject before using a gum care product and an ultrasonic image of the inside of the attached gingiva of the subject after using the gum care product;

acquiring average brightnesses of a region of the inside of the attached gingiva in the ultrasonic images before and after using the gum care product, respectively,

wherein the region of the inside of the attached gingiva of which the ultrasonic image is acquired is at least a part of a range from immediately below epithelium to 1500 μm below epithelium-connective tissue border; and

determining that the gum care product is effective for gingival constituents when the average brightness after using the gum care product increases from the average brightness before using the gum care product, and

determining that the gum care product is not effective for gingival constituents when the average brightness after using the gum care product decreases from the average brightness before using the gum care product.

9. A method of selecting a gum care method, the method comprising:

using a measurement probe, acquiring ultrasonic images of an inside of an attached gingiva of a subject before and after gum care, for each kind of gum care;

acquiring an average brightness change before and after care for each kind of gum care, of a region of the inside of the attached gingiva in the ultrasonic images,

wherein the region of the inside of the attached gingiva of which the ultrasonic images are acquired is at least a part of a range from immediately below epithelium to 1500 μm below epithelium-connective tissue border; and

selecting a gum care method with a large amount of average brightness increase before and after care among the average brightness changes before and after care for each kind of gum care.

10. An oral indicator determining device comprising:

an image acquisition unit configured to acquire an ultrasonic image of an inside of an attached gingiva of a subject, using a measurement probe; and

an analysis unit configured to analyze the ultrasonic image, the analysis unit including a calculation unit configured to calculate average brightness of the region of the inside of the attached gingiva from the ultrasonic image, and a determination unit configured to determine an oral indicator by referring to the average brightness and a reference of the oral indicator,

wherein the region of the inside of the attached gingiva of which the ultrasonic image is acquired is at least a part of a range from immediately below epithelium to 1500 μm below epithelium-connective tissue border.

11. The oral indicator determining device according to claim 10, wherein a tip end of the measurement probe for measuring a surface of the attached gingiva has a diameter of 0.1 to 5 mm.

12. The oral indicator determining device according to claim 10 or 11, wherein the ultrasonic image is acquired with ultrasound having a radiation wavelength of 10 to 50 MHz.

13. The oral indicator determining device according to any one of claims 10 to 12, wherein the reference is already-acquired average brightness associated with the oral indicator.

14. The oral indicator determining device according to any one of claims 10 to 12, wherein the reference is a statistical regression formula of the oral indicator.

15. The testing method according to any one of claims 1 to 7, wherein the oral indicator is one or more selected from the group consisted of the all teeth average pocket depth, the amount of gingival collagen, the gingival age representing the aging state of the gingiva, an indicator related to the state and/or symptom of the gingiva, such as tooth mobility, the bleeding on probing (BOP) positive ratio, periodontal inflamed surface area (PISA), and periodontal epithelial surface area (PESA).

16. The testing method according to any one of claims 1 to 7 and 15, wherein the indicator determination step is a step of determining that the amount of gingival collagen is

large, the gingival age is young, the all teeth average pocket depth is shallow, the mobility of adjacent teeth is low, the bleeding on probing (BOP) positive ratio is low, the periodontal inflamed surface area (PISA) is small, or the periodontal epithelial surface area (PESA) is small when the average brightness of the subject is higher than a reference value that is the already-acquired average brightness associated with the oral indicator.