[CLAIMS]

What is claimed is:

[Claim 1]

A toothbrush comprising:

a bristle implanted portion that is formed of a plurality of bristle bundles implanted by the metal piece-scheme bristle implanting;

a head portion with a bristle implanted surface in which the bristle implanted portion is provided;

a neck portion that extends from the head portion;

and a handle portion that extends from the neck portion,

wherein a thickness of the head portion is 2.0 to 4.0 mm,

a minimum width of the neck portion is 3.0 to 4.5 mm,

the minimum width is the width at the position where the width of the neck portion is minimized,

a minimum thickness of the neck portion is 3.0 to 4.5 mm,

the minimum thickness is the thickness at the position where the width of the neck portion is minimized,

a curved surface with an arc-shaped outline, which has a center position arranged on the side of the bristle implanted surface and is recessed on the side of the bristle implanted surface in a side view, is formed on the side of the bristle implanted surface on the rear end side of the neck portion,

a gripping center point height which is a distance between the center point in the thickness direction of the handle portion at a gripping center position of the toothbrush and a plane that forms the bristle implanted surface is 6.0 to 12.0 mm,

when a numerical value of an amount of deflection of the head portion which is

measured by a method (α) described below is assumed to be A, a numerical value of an amount of deflection of the neck portion which is measured by a method (β) described below is assumed to be B,

a difference (B – A) between the amount of deflection A and the amount of deflection B is 1 to 4 mm, and

the amount of deflection B is 2.1 to 5.0 mm;

Method (α): A height of a tip end of a handle body in a state in which the bristle implanted surface of the head portion is directed upward in the vertical direction and a position of a boundary P1 between the head portion and the neck portion is fixed is assumed to be a reference height, a 200 g weight is suspended at a position corresponding to 10 ± 3% from a tip end of the bristle implanted portion relative to a length in a longer axis direction of the bristle implanted portion at the head portion in the state in which the position of the boundary P1 is fixed, and an amount of displacement (a unit is mm) of the height from the reference height of the tip end of the handle body 10 seconds later is assumed to be the amount of deflection A of the head portion; and

Method (β): The height of the tip end of the handle body in a state in which the bristle implanted surface of the head portion is directed upward in the vertical direction and the position of the boundary P2 between the neck portion and the handle portion is fixed is assumed to be a reference height, a 200 g spindle is further suspended at a position corresponding to 50 ± 3% from the tip end of the bristle implanted portion relative to the length in the longer axis direction of the bristle implanted portion at the head portion in the fixed state, and the amount of displacement (the unit is mm) of the height from the reference height of the tip end of the handle body 10 seconds later is assumed to be the amount of deflection B of the neck portion.

[Claim 2]

The toothbrush according to claim 1,

wherein the amount of deflection A is 0.5 to 2.0 mm.

[Claim 3]

The toothbrush according to claim 1 or 2,

wherein the amount of deflection B is 2.1 to 4.0 mm.

[Claim 4]

The toothbrush according to claim 1 or 2,

wherein a gripping center point angle, which is an angle between a straight line connecting a center point in a thickness direction of the handle portion at a gripping center position of the toothbrush and a center point in a thickness direction of the head portion at a center position of the bristle implanted portion and a plane that forms the bristle implanted surface, is 5.0 to 10.0 degrees.

[Claim 5]

The toothbrush according to claim 1 or 2,

wherein a ratio (B/A) between the amount of deflection B and the amount of deflection A is 1.5 to 5.0.

[Claim 6]

The toothbrush according to claim 1 or 2,

wherein a product (A × B) of the amount of deflection A and the amount of deflection B is 0.8 to 10.

[Claim 7]

The toothbrush according to claim 4,

wherein the gripping center point angle is 6.0 to 10.0 degrees.

[Claim 8]

The toothbrush according to claim 1 or 2,

wherein a length of the neck portion is 25 to 70 mm.

[Claim 9]

The toothbrush according to claim 1 or 2,

wherein a constituent material of a handle body which includes the head portion, the neck portion, and the handle portion includes at least one of the group of polypropylene, polyethylene terephthalate, polybutylene terephthalate, polycyclohexylene dimethylene terephthalate, polyacetal, polyethylene naphthalate, polystyrene, acrylonitrile butadiene styrene resin, cellulose propionate, polyarylate, polycarbonate, and acrylonitrile styrene copolymer resin.

[Claim 10]

The toothbrush according to claim 1 or 2,

wherein a bending elastic modulus of a constituent material of the neck portion is equal to or greater than 1000 MPa and equal to or less than 2200 MPa.

[Claim 11]

The toothbrush according to claim 1 or 2,

wherein a constituent material of the neck portion is polypropylene resin.

[Claim 12]

A toothbrush comprising:

a bristle implanted portion that is formed of a plurality of bristle bundles implanted by the metal piece-scheme bristle implanting;

a head portion with a bristle implanted surface in which the bristle implanted portion is provided;

a neck portion that extends from the head portion;

and a handle portion that extends from the neck portion,

wherein a thickness of the head portion is 2.0 to 4.0 mm,

a minimum width of the neck portion is 3.0 to 4.3 mm,

the minimum width is the width at the position where the width of the neck portion is minimized,

a minimum thickness of the neck portion is 3.0 to 4.5 mm,

the minimum thickness is the thickness at the position where the width of the neck portion is minimized,

a curved surface with an arc-shaped outline, which has a center position arranged on the side of the bristle implanted surface and is recessed on the side of the bristle implanted surface in a side view, is formed on the side of the bristle implanted surface on the rear end side of the neck portion,

a gripping center point angle, which is an angle between a straight line connecting a center point in a thickness direction of the handle portion at a gripping center position of the toothbrush and a center point in a thickness direction of the head portion at a center position of the bristle implanted portion and a plane that forms the bristle implanted surface, is 5.0 to 10.0 degrees,

when a numerical value of an amount of deflection of the head portion which is measured by a method (α) described below is assumed to be A, a numerical value of an amount of deflection of the neck portion which is measured by a method (β) described below is assumed to be B,

a product (A × B) of the amount of deflection A and the amount of deflection B is 0.8 to 10, and

the amount of deflection B is 2.1 to 5.0 mm;

Method (α): A height of a tip end of a handle body in a state in which the bristle

implanted surface of the head portion is directed upward in the vertical direction and a position of a boundary P1 between the head portion and the neck portion is fixed is assumed to be a reference height, a 200 g weight is suspended at a position corresponding to 10 ± 3% from a tip end of the bristle implanted portion relative to a length in a longer axis direction of the bristle implanted portion at the head portion in the state in which the position of the boundary P1 is fixed, and an amount of displacement (a unit is mm) of the height from the reference height of the tip end of the handle body 10 seconds later is assumed to be the amount of deflection A of the head portion; and

Method (β): The height of the tip end of the handle body in a state in which the bristle implanted surface of the head portion is directed upward in the vertical direction and the position of the boundary P2 between the neck portion and the handle portion is fixed is assumed to be a reference height, a 200 g spindle is further suspended at a position corresponding to 50 ± 3% from the tip end of the bristle implanted portion relative to the length in the longer axis direction of the bristle implanted portion at the head portion in the fixed state, and the amount of displacement (the unit is mm) of the height from the reference height of the tip end of the handle body 10 seconds later is assumed to be the amount of deflection B of the neck portion.

[Claim 13]

The toothbrush according to claim 12,

wherein the amount of deflection A is 0.5 to 2.0 mm.

[Claim 14]

The toothbrush according to claim 12 or 13,

wherein the amount of deflection B is 2.1 to 4.0 mm.

[Claim 15]

The toothbrush according to claim 12 or 13

wherein a ratio (B/A) between the amount of deflection B and the amount of deflection A is 1.5 to 5.0.

[Claim 16]

The toothbrush according to claim 12 or 13,

a difference (B – A) between the amount of deflection A and the amount of deflection B is 1 to 4 mm.

[Claim 17]

The toothbrush according to claim 12 or 13

wherein the gripping center point angle is 6.0 to 10.0 degrees.

[Claim 18]

The toothbrush according to claim 12 or 13,

wherein a length of the neck portion is 25 to 70 mm.

[Claim 19]

The toothbrush according to claim 12 or 13,

wherein a constituent material of a handle body which includes the head portion, the neck portion, and the handle portion includes at least one of the group of polypropylene, polyethylene terephthalate, polybutylene terephthalate, polycyclohexylene dimethylene terephthalate, polyacetal, polyethylene naphthalate, polystyrene, acrylonitrile butadiene styrene resin, cellulose propionate, polyarylate, polycarbonate, and acrylonitrile styrene copolymer resin.

[Claim 20]

The toothbrush according to claim 12 or 13,

wherein a bending elastic modulus of a constituent material of the neck portion is equal to or greater than 1000 MPa and equal to or less than 2200 MPa.

[Claim 21]

The toothbrush according to claim 12 or 13,

wherein the constituent material of the neck portion is polypropylene resin.