[CLAIMS]

What is claimed is:

[Claim 1]

A toothbrush comprising:

a head portion that is arranged on a tip end side and has a bristle implanted surface with bristle bundles implanted by the metal piece-scheme bristle implanting;

a neck portion that extends on a rear end side of the head portion; and

a handle portion that extends on a rear end side of the neck portion,

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

the neck portion is formed such that the width constantly or gradually increases toward the rear end side from a position corresponding to a minimum value of a width in a direction that is parallel to the bristle implanted surface and intersects a length direction of the handle portion perpendicularly,

when a width of the neck portion is assumed to be W mm, and a thickness of the neck portion in a direction that intersects the bristle implanted surface perpendicularly is assumed to be D mm, a deflection coefficient is assumed to be $M\ (mm^4) = W \times D^3$,

a position corresponding to the minimum value of the width at the neck portion is assumed to be a reference point,

a deflection coefficient $M_0\ (mm^4) = W \times D^3$ at the reference point is equal to or greater than 165 mm^4 and equal to or less than 330 mm^4,

a rate of change ($M_1 \div M_0$) of a deflection coefficient M_1 at a position that is separated from the reference point by 10 mm on the rear end side relative to the deflection coefficient M_0 at the reference point is equal to or greater than 1.0 and equal to or less than 1.3,

a rate of change ($M_3 \div M_2$) of a deflection coefficient M_3 at a position that is separated from the reference point by 30 mm on the rear end side relative to a deflection coefficient M_2 at a position that is separated from the reference point by 20 mm on the rear end side is equal to or greater than 1.7 and equal to or less than 3.0,

a difference (B – A) between an amount of deflection A of the head portion, which is measured by a method (α) described below and an amount of deflection B of the neck portion, which is measured by a method (β) described below 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 ~~state~~, 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 a rate of change ($M_2 \div M_1$) of the deflection coefficient M_2 at the position that is separated from the reference point by 20 mm on the rear end side relative to the deflection coefficient M_1 at the position that is separated from the reference point by 10 mm on the rear end side is equal to or greater than 1.3 and equal to or less than 1.8.

[Claim 3]

The toothbrush according to claim 1 or 2,

wherein the amount of deflection A is 0.4 to 3.0 mm.

[Claim 4]

The toothbrush according to ~~any one of~~ claim~~s~~ 1 or 2~~to 3~~,

wherein the deflection coefficient M_1 at the position that is separated from the reference point by 10 mm on the rear end side is equal to or greater than 165 mm^4 and equal to or less than 330 mm^4.

[Claim 5]

The toothbrush according to claims 1 or 2,

wherein the deflection coefficient M_3 at a position that is separated from the reference point by 30 mm on the rear end side is equal to or greater than 600 mm^4 and equal to or less than 1500 mm^4.

[Claim 6]

The toothbrush according to claims 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 7]

The toothbrush according to claim 1 or 2,

wherein a minimum width of the neck portion is 3.5 to 4.5 mm.

[Claim 8]

The toothbrush according to claim 1 or 2,

wherein the rate of change ($M_3 \div M_2$) of the deflection coefficient M_3 at the position that is separated from the reference point by 30 mm on the rear end side relative to the deflection coefficient M_2 at the position that is separated from the reference point by 20 mm on the rear end side is equal to or greater than 1.8 and equal to or less than 3.0.

[Claim 9]

The toothbrush according to claim 1 or 2,

wherein the difference (B – A) between the amount of deflection A and the amount of deflection B is 1.5 to 4 mm.

[Claim 10]

The toothbrush according to claim 1 or 2,

wherein the amount of deflection B is 2.3 to 4.5 mm.

[Claim 11]

The toothbrush according to claim ~~3~~1 or 2,

wherein the amount of deflection A is 0.4 to 2.0 mm.

[Claim 12]

The toothbrush according to claim 1 or 2,

wherein a length of the neck portion is ~~25~~ 30 to 70 mm.

[Claim 13]

The toothbrush according to claim 1 or 2,

wherein a length of the head portion is 10 to 33 mm.

[Claim 14]

The toothbrush according to claim 1 or 2,

wherein the material of~~the head portion, the neck portion and~~ the handle body ~~are formed of~~is a resin ~~material, and~~having a ~~bending elastic modulus of the resin material which is measured in accordance with JIS 7171 is~~ equal to or greater than 1000 MPa and equal to or less than 2200 MPa.

[Claim 15]

The toothbrush according to claim 1 or 2,

wherein a resin material of the handle body ~~includes~~ is at least one ~~of~~ selected from the group of polypropylene resin (PP), polyacetal resin (POM), polystyrene resin (PS), polyethylene terephthalate resin (PET), polybutylene terephthalate resin (PBT), acrylonitrile butadiene styrene resin (ABS), polyarylate resin, polycarbonate resin, and acrylonitrile styrene resin.

[Claim 16]

The toothbrush according to claim 15,

wherein the ~~resin~~ material of the handle body is a polypropylene resin (PP).