handle placement of a stent into a tubular organ of small diameter of around 2 mm, a result of which there has been a risk of damaging a body tissue.

In order to solve such problems, a spiral stent has been devised as a technology exhibiting high flexibility while being a stent having a closed cell structure (for example, refer to Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No. 2010-535075.) The stent disclosed in Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No. 2010-535075 includes spiral circular bodies having a wavy-line pattern and coiled elements connecting adjacent circular bodies in an expanded state.

Patent Document 1: Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No. 2010-535075

DISCLOSURE

However, after a stent has been placed in a superficial femoral artery, for example, inner and outer rotational actions of a femoral area cause inner and outer rotations of a blood vessel. The stent in the blood vessel thereby is also distorted in an inner rotational direction and an outer rotational direction. However, in Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No. 2010-535075, since the deformed form of a stent differs depending on a direction in which the stent is distorted,

distorted deformations of the stent due to the inner and outer rotations of the blood vessel become uneven, for example. Therefore, a difference arises in load on blood vessel walls from stents between left and right blood vessels. In particular, since there are differences among individuals in ratios of inner and outer rotations between left and right legs, for a patient who frequently performs an inner rotation of both legs, for example, in a case in which the stent is a stent that follows an inner rotation of the right leg, the stent cannot follow the inner rotation of the left leg. For this reason, since the load on the blood vessel walls from the stent differs between the left and right legs, even if treatment is done with the same stent, the rate of incurring a complicating disease after the stent being placed differs between the left and right legs.

Furthermore, since there are both inner and outer rotations for one leg, for example, the right leg, as described above, a stent that follows an inner rotation well cannot follow an outer rotation well. Due to the abovementioned problem, the following clinical problems occur:

(1) the risk of the stent being broken increases due to repetitive distorting loading; and

(2) the risk of a blood vessel wall being damaged increases due to stress being applied intensively from a stent at a local portion thereof.

Regarding the stent of Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No.

2010-535075, the coiled elements can be assumed approximately as a portion of the structure of a wound spring. Furthermore, if distorting loading is applied to the stent, deformation is caused intensively at the coiled elements. For this reason, it is possible to predict a reaction of a distorted deformation of this stent by considering of the distorted deformation of the spring structure of the coiled elements.

Here, distorted deformation behaviors in a case of assuming a deformation of a coiled element in an expanded state of the stent of Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No. 2010-535075 as a part of a left-hand spring structure are illustrated in FIGS 18(b), (c), (e), and (f). As illustrated in FIGS. 18(b) and (e), when a distortion in a left-hand direction is applied to a left-hand spring, a force acts so as to be pulled in a perpendicular direction with respect to a cross section of an element wire of the spring. For this reason, as illustrated in FIGS. 18(c) and (f), the element wire is deformed so as to be wound in the circumferential direction thereof and exhibits a behavior of being radially reduced in the radial direction. On the other hand, when a distortion in a right-hand direction is applied, a force acts so as to be compressed in a perpendicular direction with respect to the cross section of the element wire of the spring. For this reason, as illustrated in FIGS. 18(a) and (d), the element wire is deformed so as to be pulled away in the circumferential direction thereof and exhibits a behavior of the outside

diameter being expanded in a radial direction as a result.

Since the stent of Japanese Unexamined Patent Application (Translation of PCT Publication), Publication No. 2010-535075 is composed of a spring body, when distortion in a left or right direction is applied, it exhibits a behavior similar to the abovementioned distorted deformation of the wound spring. Due to this distorted deformation behavior, a substantial difference in deformation amounts in the radial direction of the stent between the distorted deformations in the left and right direction appears, whereby the load to blood vessel walls differs. Therefore, even when performing treatment with the same stent as describe above, treatment results may differ depending on target sites for treatment or difference among individuals.

Therefore, it is an object of the present disclosure to provide a highly flexible stent that can suppress a deformation amount in the radial direction of the stent with respect to a distortion load.

Means for Solving the Problems

In an aspect, the present disclosure provides a highly flexible stent comprising: a plurality of wavy-line pattern bodies having a wavy-line pattern and arranged side-by-side in an axial direction; and a plurality of coiled elements arranged between the wavy-line pattern bodies that are adjacent and extending in a spiral manner around an axis, wherein all apices on opposite sides of the wavy-line pattern of the wavy-line pattern bodies

that are adjacent are connected by way of the

coiled elements, wherein, when viewing in a radial direction perpendicular to the axial direction, a circular direction of the wavy-line pattern bodies is inclined with respect to the radial direction, and wherein a winding direction of one of the coiled elements located at one side in the axial direction with respect to the wavy-line pattern bodies and a winding direction of one other of the coiled elements located at the other side in the axial direction are opposite.

An angle at which the circular direction of the wavy-line pattern bodies inclines with respect to the radial direction may be 30° to 60°.

The wavy-line pattern bodies may form a circular body by connecting, in a circumferential direction, a plurality of waveform elements of substantially V-shape made by coupling two leg portions at an apex, and the length of the one of the coiled elements may be longer than the length of the leg portion and the length of the one other of the coiled elements may be shorter than the length of the leg portion.

The length of the one of the coiled elements may be no more than 1.5 times the length of the leg portion.

The wavy-line pattern bodies may be non-continuous in a circumferential direction and may not form a circular body, and may have a shape in which one or a plurality of struts that constitutes the wavy-line pattern bodies is omitted, as compared with the wavy-line pattern bodies that form a circular body.

A cross sectional shape may be a substantially triangular

shape.

According to the present disclosure, it is possible to provide a highly flexible stent that can suppress a deformation amount in the radial direction of the stent with respect to a distortion load.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a highly flexible stent in an unloaded state according to a first embodiment of the present invention;

FIG. 2 is a developed view showing a highly flexible stent in an unloaded state according to a first embodiment of the present invention that is virtually expanded into a plane;

FIG. 3 is a partially enlarged view of the stent shown in FIG. 2;

FIG. 4 is a partially enlarged view of the stent shown in FIG. 3;

FIG. 5 provides illustrative views showing the matter of deformation occurring at an apex of a waveform element of the circular body of a stent when the stent is radially reduced;

FIG. 6A is a schematic view showing a deformation state of a waveform element during diameter reduction in a case in which a slit is not provided at an apex of a waveform element of the circular body of a stent;

FIG. 6B is a schematic view showing a deformation state of a waveform element during diameter reduction in a case in