

## Title (en)

DEVICE AND METHOD FOR IMPLANTATION THAT RESTORES PHYSIOLOGIC RANGE OF MOTION BY ESTABLISHING AN ADJUSTABLE CONSTRAINED MOTION OF THE SPINE WITHOUT INTRUSION OF ASSOCIATED FACET JOINTS

## Title (de)

IMPLANTATIONSVORRICHTUNG UND -VERFAHREN ZUR WIEDERHERSTELLUNG EINES PHYSIOLOGISCHEN BEWEGUNGSBEREICHES DURCH HERSTELLUNG EINER EINSTELLBAREN EINGESCHRÄNKTEN BEWEGUNG DER WIRBELSÄULE OHNE EINDRINGUNG BENACHBARTER FACETTENGELLENKE

## Title (fr)

DISPOSITIF ET PROCÉDÉ D'IMPLANTATION QUI RÉTABLIT LA PLAGE PHYSIOLOGIQUE DE DÉPLACEMENT EN ÉTABLISSANT UN DÉPLACEMENT LIMITÉ AJUSTABLE DE LA COLONNE VERTÉBRALE SANS INTRUSION DANS LES ARTICULATIONS INTERVERTÉBRALES ASSOCIÉES

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## Application

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## Abstract (en)

[origin: WO2009146020A1] A device and method of insertion and use that provides for adjustable, constrained motion of a spinal motion segment that is affected by degenerative disease, microinstability, etc. is disclosed. The device does so by establishing a specified range of motion of said target motion segment. The specified range of motion is thought to recapitulate the natural planes of movement and, in this fashion, the device restores the natural, physiologic motion of said target motion segment. This range of motion is thought to be particularly physiologic because it is adjusted to the individual target motion segment within a specific patient. This adjustment can be made as the result of the central mechanism governing the device, which is a lever arm interfacing with a fluid medium, known as a constraining medium. The other end of the lever arm is the leading end of a pedicle screw that has been inserted into the vertebra of the target motion segment. By adjusting the amount of fluid in the chamber, the interface between the lever arm and the fluid can be modulated. This is eventually translated to the other end of the lever arm which is the pedicle screw and through this mechanism the amount of movement of the target motion segment can be modulated. Furthermore, the device can be implanted using a minimally invasive technique. Critically, the device can accomplish its stated goals without creating an intrusion upon the facet joints adjacent to the target motion segment. This will allow forces that are transmitted from the vertebrae through the pedicle screws to be acted upon equally, and, in turn, permit the constraining medium to respond to forces applied upon the construct from any direction. This spherical enlargement at the terminal end of the diagonal connector is encased entirely within the chamber housing unit, and as stated above serves as the interface with the constraining medium. A central component of the principal device is a first class lever this chamber is filled, to varying degrees, with a fluid - hereinafter known as the constraining medium. The trailing end of the lever arm must, therefore, exert the moment of inertia translated from the leading against the resistance created by this [nearly incompressible] fluid. The effect of such an arrangement results in resistance of the trailing end of the lever arm to movement and, in turn, in dampening of the movements (moments of inertia) of the trailing end of the lever arm. An It is this interface that creates the "fluid- lever" mechanism which represents the output arm of the lever. This ultimately provides the adjustable constrained motion to the target motion segment through the theoretical mechanisms of levers and fluid dynamics as reviewed above. acceptable assumption is that such a dampening of the movements of any one end of a lever arm will have a reciprocal effect on the other end of the lever arm. When the invention functions in its preferred embodiment, if excessive or abnormal motion occurs at the leading end of the lever arm (pedicle screw within the vertebra), this abnormal movement creates a moment of inertia which is translated to the trailing end of the lever arm where this moment is then dampened down and then translated back to the leading end of the lever arm. Hence, the combined function of the moment of inertia of the lever arm and the fluid dynamics in the chamber ultimately results in reduction/ elimination of excessive or abnormal movement of the motion segment and restoration of "normal" or physiologic motion.

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