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IMAGES IN CARDIOVASCULAR INTERVENTION

# The RotaWire may be spinning in rotational atherectomy under the maximum rotational speed

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The transection of the RotaWire (Boston Scientific, Natrick, MA, USA), which is associated with vessel perforation [1], should be avoided in rotational atherectomy (RA). However, the mechanism of the transection of the RotaWire has not been clearly explained. Because the brake within the advancer as well as the WireClip Torquer (Boston Scientific, Natrick, MA, USA) should fix the RotaWire, the RotaWire theoretically would not spin in the high speed mode unless the brake defeat button is pressed. We hypothesized that the RotaWire would spin in spite of the brake within the advancer and the WireClip Torquer, if the maximum rotational speed is used. We performed a preliminary bench test, which compared the motion of the RotaWire among "the burr 1.5 mm with 140,000 rotations per minute (rpm)", "the burr 1.5 mm with the maximum rotational speed", "the burr 2.15 mm with 140,000 rpm" and "the burr 2.15 mm with the maximum rotational speed" (Fig. 1). In the maximum rotational speed, we turned the speed nob in the console until the limit. The WireClip Torquer was attached to the end of the RotaWire floppy. In the movie (Supplemental file 1), the RotaWire was obviously spinning in the burr 2.15 mm with the maximum rotational speed, while the RotaWire might be slightly spinning in the burr 2.15 mm with 140,000 rpm. The RotaWire was also spinning in the burr 1.5 mm with the maximum rotational speed, while the RotaWire was not spinning in the burr 1.5 mm with 140,000 rpm. Although this preliminary bench test cannot prove our hypothesis with sufficient data, this test suggests the possibility that the RotaWire may spin in the maximum rotational speed in spite of the brake within the advancer and the WireClip Torquer, which has been considered not to occur in clinical settings. If the RotaWire spin during RA, the RotaWire may be damaged, especially the spring tip of the RotaWire. Although the manufacturer of Rotablator recommends the rotational speed < 190,000 rpm [2], the maximum rotational speed such as 220,000 rpm is sometimes used in clinical

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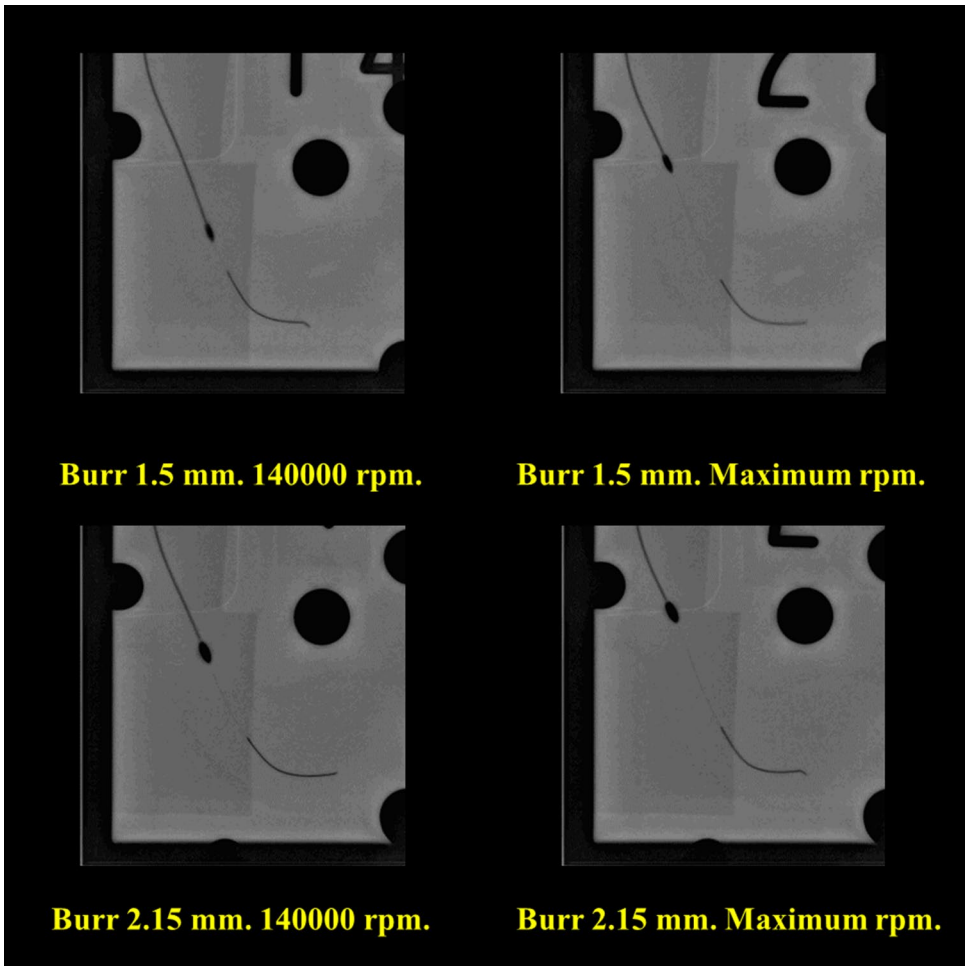


**Fig. 1** The comparison of the motion of RotaWire among 4 different settings. The upper left: "the burr 1.5 mm with 140,000 rpm"; the upper right: "the burr 1.5 mm with the maximum rotational speed"; the lower left: "the burr 2.15 mm with 140,000 rpm"; the lower right: "the burr 2.15 mm with the maximum rotational speed"

settings [3]. To prevent the RotaWire from spinning, it may be important to adjust the rotational speed within the instructions for use (< 190,000 rpm) [2].

## Compliance with ethical standards

**Conflict of interest** Dr. Sakakura has received speaking honoraria from Abbott Vascular, Boston Scientific, Medtronic Cardiovascular, Terumo, OrbusNeich, Japan Lifeline and NIPRO; has served as a proctor for Rotablator for Boston Scientific; and has served as a consultant for Abbott Vascular and Boston Scientific. Prof. Fujita served as a consultant for Mehergen Group Holdings, Inc.

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