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Although the risk of kendo-associated hearing loss has long been known, its mechanism remains unclear.

Our hypothesis is that the cause of hearing loss by kendo might possibly be related to the accumulation of small concussions in the inner ear by the excessive impact-induced bone conduction. We evaluated this hypothesis by impact experiments using a skull bone model (Fig. 1) and simulation using Finite Element (FE) model of human head and kendo helmet (Fig. 2).

To get points and win matches, each player tries to hit one of the four target areas on an opponent's body with a bamboo sword. Kendo, Japanese fencing, is a modern martial art descended from the application range as a method of 3D measurement in an industrial field. To do this in our research, we propose an inspection environment for realizing an inexpensive and highly precise 3D measurement scheme and its algorithm.

Because stereo measurement has a simple system configuration, and because highly precise measurements are possible when the corresponding point information of the image is clear, wide utilization is advanced on various scenes such as use in an industry and security field. To realize the function of stereo views with one camera, a mechanism shown in Figure 1 was fabricated, where a camera is fixed and the work is set as movable along with the feeder. The left and right stereo images were captured at the respective moments before and after the mechanical feeder motion. The baseline was calculated precisely using corresponding feature points extracted from these two images. Some feature points are extracted precisely by the original algorithm for image processing.

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