

## Summary

**Background:** Surfing was added as an official event of the Tokyo Olympics in 2020. There are many surfers troubled by low back pain, but there is no scientific analysis until now. This time, we took MRI on the lumbar vertebrae in 20 official professional surfers and examined the relationship between the low back pain and the rate of the lumbar disc degeneration.

**Materials and methods:** Subjects are 20 people (16 men, 4 women) of 17 Japan official professional surfers and 3 Japan official professionals bodyboarders in total, average age 29.8 years old (17–57 years), we investigated by use of the lumbar vertebrae T2-weighted magnetic resonance imaging.

**Results:** 11 people (55%) had the low back pain, 10 people (50%) had the lumbar disc degeneration (more than Grade III of Pfirrmann classification), 2 people (10%) had the lumbar spondylolysis. There is no relationship between the low back pain and the rate of the disc degeneration.

**Conclusions:** The prevalence rate of low back pain in the professional surfers was approximately equal to previous report. The prevalence rate of the lumbar disc degeneration was 50%, and it was not high rate particularly in comparison with baseball and the swimming. The surfing competition is easy to cause the low back pain, but is not easy to cause the disc degeneration.

## Keywords

Surfing – Professional surfer – Low back pain – MRI – Lumbar disc degeneration

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## Lumbale Bandscheibendegeneration bei professionellen Surfern

## Zusammenfassung

**Hintergrund:** Surfen (Wellenreiten) wird als offizielle Disziplin in das Programm der olympischen Spiele 2020 in Tokio aufgenommen. Obwohl es

## ORIGINAL PAPER / SPECIAL ISSUE

# Lumbar intervertebral disc degeneration in professional surfers

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## Background

Surfing is recently attracting a lot of attention as one of the Olympic games at Tokyo 2020. However, there have been very few published reports which concerns sports-related acute injuries and chronic disorders sustained during surfing. Moreover, many studies of injury on surfing were conducted on recreational (armature) surfers. Those studies tend to include many minor injuries such as skin laceration and contusions, which would be resulted from surfer's insufficient skills. Thus, we believe that those studies do not precisely reflect the specificity of athletic surfing in terms of epidemiology. The purpose of this study is to clarify the relationship between the low back pain and the rate of the lumbar disc degeneration.

## Materials and methods

Between 2015 and 2016, Subjects are 20 people (16 men, 4 women) of 17 Japan official professional surfers and 3 Japan official professionals bodyboarders in total, average age is 29.8 years old (17–

57 years). Average surfing career duration is 16.5 year (7–40 years). Average height is 166.6 cm (152.2–179.9 cm), body weight is 59.7 kg (40.0–76.6 kg) and Body mass index is 21.4 kg/m<sup>2</sup> (17.3–26.6 kg/m<sup>2</sup>). We investigated by use of the lumbar vertebrae magnetic resonance imaging (MRI).

## Assessment of disc degeneration

We examined T2-weighted, density-weighted, fast spin-echo sagittal MRI scans (repetition time, 5000 ms; echo time, 107 ms) of the participant's lumbar spine using a 1.5 T imager (Excelart Vantage, Toshiba, Tokyo, Japan). Vertebral discs from L1/2 to L5/S1 in the mid-sagittal images were assessed. The degree of degeneration was classified into 5 grades according to Pfirrmann's classification (Fig. 1), with grade III or more considered degenerated. The images were assessed by one radiologist and one orthopaedic surgeon.

## Low back pain

We asked about experiences of low back pain during their lifetime and during surfing (yes or no).

bekannt ist, dass viele Surfer unter Rückenproblemen leiden, fehlt eine wissenschaftliche Analyse der Situation. In der vorliegenden Studie wurde bei 20 professionellen Surfern eine MRT der Lendenwirbelsäule durchgeführt und der Zusammenhang zwischen dem tiefsitzenden Rückenschmerz und der Ausprägung der Degeneration der lumbalen Bandscheiben untersucht.

**Material und Methoden:** Eingeschlossen in die Studie sind 20 Profi Surfer (16 Männer, 4 Frauen) mit einem Durchschnittsalter von 29.8 Jahren (17–57 Jahre). Ausgewertet wurden die T2 gewichteten MRT-Aufnahmen der Lendenwirbelsäule.

**Ergebnisse:** 11 Surfer (55%) wiesen lumbale Rückenbeschwerden auf, 10 Surfer (50%) präsentierten eine Bandscheibendegeneration (höhergradig als Grad III der Pfirrmann Klassifikation). 2 Surfer (10%) zeigten eine lumbale Spondylolyse. Ein Zusammenhang zwischen dem lumbalen Rückenschmerz und dem Degenerationszustand der Bandscheiben zeigte sich nicht.

**Zusammenfassung:** Die Prävalenz des lumbalen Rückenschmerzes bei professionellen Surfern entsprach den Ergebnissen früherer Studien. Die Prävalenz der lumbalen Bandscheibendegeneration betrug 50%, was keinen hohen Wert im Vergleich mit Baseball und Schwimmen darstellt. Professionelles Surfen ist häufig mit lumbalen Rückenschmerzen verbunden, aber nicht mit dem Degenerationsgrad der Bandscheiben.

#### Schlüsselwörter

Surfen – Profi Surfer – Lumbaler Rückenschmerz – MRT – Lumbale Bandscheibendegeneration

## Results

11 people (55%) had the low back pain (surfers feel only a slight back pain after surfing, and there were no surfers who feel pain in their daily lives.). 10 people (50%) had the lumbar disc degeneration (more than

Grade III), 2 people (10%) had the lumbar spondylolysis. There is no relationship between the low back pain and the rate of the disc degeneration (Pearson's chi-square test  $P = 0.61$ ) (Table 1).

But the mean age of surfers with disc degeneration is 31.5 years

**Table 1.** Disc degeneration and low back pain.

	LBP(+)*	LBP(-)	total
DD(+)**	6	4	10
DD(-)	5	5	10
total	11	9	20

\* LBP: Low Back Pain.

\*\* DD: Disc Degeneration.

**Table 2.** Level of disc degeneration.

Pfirrmann's Grade	L4/5	L5/S1
III	3	2
IV	4	3
V	0	2

**Table 3.** Comparison of incidence of lumbar disc degeneration between surfing and other competitions.

sports	years	incidence	n
surfing	29.8	50.0%	20
baseball [3]	19.8	59.7%	57
swimming[3]	19.5	57.7%	47
Basketball[3]	19.7	42.9%	63
Non athletes[3]	19.5	31.4%	71

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