ACUTE EFFECT OF REMOTE VIDEO YOGA ON JOINT RANGE OF MOTION

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INTRODUCTION: Yoga has been a popular form of exercise and has been become an adopted recovery strategy for both athletes and fitness enthusiasts. While several studies have shown the positive effect yoga programs have on joint range of motion (ROM)[1,2,3], few studies have evaluated the acute effect yoga has on ROM directly after exposure.[4]

The purpose of this investigation was to further investigate the changes in shoulder, hip, and torso ROM that occur after participating in a vinyasa-based yoga class.

METHODS & RESULTS: Twelve healthy adults were recruited for participation in this study. Each participant was assessed for joint range-of-motion before and after receiving a 60 minute vinyasa-based yoga class. Class was remotely instructed via video streaming technology (Zoom, San Jose, CA).

Joint range-of-motion (ROM) was assessed by first instructing participants through a series of twelve slow controlled movements while facing the participant's standard video camera on their mobile device or laptop. All frames of video were captured with screen recording software (Quicktime, Cupertino, CA) and were fed through a semi-automated skeletal tracking procedure (Tensorflow, Mountain View, CA).

Active shoulder external/internal rotation (SER, SIR) and trunk flexion/extension were assessed with the participant facing perpendicular to their camera and while rotating or bending to their end range-of-motion in both directions.

Active hip external/internal rotation (HER, HIR) and trunk lateral tilt were assessed with the participant directly facing the camera in a seated position, while rotating their hips or bending their torso to their end ranges like the shoulder ROM tests.

Biomechanical data were summarized and statistically analyzed in Matlab 2016B (Mathworks, Natick, MA). Pre and post test data for each measure were analyzed with paired t-tests to assess the effect of yoga on ROM (significance level of $p<0.05$).

Table 1.0 – Pre and Post test joint range-of-motion.

	Pre Test (Deg)	Post Test (Deg)	Difference (Deg)	p
R Sho Ext Rot	88 ± 10.3	96.5 ± 10.9	8.5 ± 7.2	**0.001**
R Sho Int Rot	59 ± 21.6	72.9 ± 23.8	13.8 ± 16.4	**0.009**
R Sho Total	147 ± 16.3	169.4 ± 23.2	22.4 ± 19.6	**0.002**
L Sho Ext Rot	94.6 ± 9.2	100.6 ± 9.6	5.9 ± 12.9	0.079
L Sho Int Rot	69.7 ± 21.7	71.7 ± 23	2 ± 14.4	0.325
L Sho Total	164.3 ± 22.2	172.3 ± 25	8 ± 21.6	0.125
R Hip Ext Rot	43.5 ± 12.8	46.9 ± 13.4	3.3 ± 7	0.073
R Hip Int Rot	24.6 ± 8.6	26.5 ± 5.9	1.9 ± 9.1	0.248
R Hip Total	68.1 ± 19.5	73.4 ± 15.3	5.3 ± 14.2	0.124
L Hip Ext Rot	42.2 ± 15.8	45.2 ± 14.7	3 ± 9.3	0.155
L Hip Int Rot	24.9 ± 7.6	27.1 ± 7.2	2.2 ± 2.8	**0.015**
L Hip Total	67.2 ± 15.4	72.3 ± 13.8	5.2 ± 10.8	0.071
Trunk Ext	39.5 ± 12	43.8 ± 12.2	4.3 ± 4.9	**0.007**
Trunk Flex	131.2 ± 10.8	134.6 ± 13.1	3.4 ± 14.5	0.226
Trunk Sagittal Total	170.7 ± 11.2	178.4 ± 14.4	7.7 ± 14.7	0.056
Trunk L Tilt	25.5 ± 6.8	29.3 ± 8.6	3.8 ± 3.5	**0.003**
Trunk R Tilt	27.4 ± 4.7	30.6 ± 7.1	3.1 ± 4	**0.013**
Trunk Tilt Total	53 ± 10.2	59.9 ± 13.7	6.9 ± 5.3	**0.001**

DISCUSSION & CONCLUSION

Of the 18 total variables analyzed, all variables averaged greater range-of-motion in the post yoga class exam. Additionally, eight variables experienced significantly more ($p<0.05$) range-of-motion after exposure to yoga: Right Shoulder Total Rotation (+22.4 deg), Right Shoulder Internal Rotation (+13.8 deg), Right External Total Rotation (+8.5 deg), Trunk Total Tilt (+6.9 deg), Trunk Extension (+4.3 deg), Trunk Left Lateral Tilt (+3.8 deg), Trunk Right Lateral Tilt (+3.1 deg) and Left Hip Internal Rotation (+2.2 deg).

Vinyasa yoga had a significantly positive effect on trunk, shoulder, and hip range-of-motion. The long term adaptations of yoga should be studied further.

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