A Study on the Intensity of Water Noodle Aerobic Exercise for Adults

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1 OBJECTIVES

Water aerobics are considered to be a fine way to improve people's fitness level without risk of injury (Steve Tarpinian, Brian J. Awbrey,1997.). Noodle is one of the commonly used equipments in water aerobics. Noodle is made from foamed polyethylene with the features of light, flexible, cushioning and buoyant. It is usually used to improve exerciser's strength by adding resistance (Michael De Toia, etc. 2004). It can also be facilitated as buoyancy equipment to help exerciser floating or suspending in the water for some special works.

Heart rate is a noninvasive, instant, practical and easy index for intensity, cardiovascular and metabolism. In order to reveal the load intensity of different noodle works, 14 different movements are designed based on the noodle's feature of buoyancy and length, as well as water characteristics and human being's anatomy.

2 METHODS

Table 1: Brief introduction of the 14 selected noodle exercises.

No.	Motion	Upper limbs (hold noodle with hands)	Lower limbs
1	push jogging	Push the noodle forward	jogging
2	push squatting	Push the noodle forward	squatting
3	push jumping	Push the noodle forward	squat and jumping high
4	press squatting	Press the noodle down	squatting
5	press jumping	Press the noodle down	squat and jumping high
6	circle part jumping	Press the noodle down then push forward	Part jumping
7	circle lunges	Press the noodle down then push forward	Lunging
8	scooping	Sweeping the noodle side to side	Standing
9	waving	Sweeping the noodle from left down up to the right	Standing
10	bunny jumping	Holding the noodle	Jumping while turning
11	lifting legs	Leaning the noodle with chest	Lifting and separating legs high
12	Press lifting	Press the noodle down	Lifting and separating legs high
13	circle lifting	Press the noodle down then push forward	Lifting and separating legs high
14	scissors kicking	Leaning the noodle with back and armpit	Suspending and scissoring

In order to reveal the load intensity of different noodle works, 14 different movements are designed based on the noodle's feature of buoyancy and length, as well as water characteristics and human being's anatomy. 8 adults subjects aged from 18 to 40 are recruited to do water exercise 90 minutes for 3 times a week through 8 weeks period. 2 tests are executed in the 6th and 8th week. Subjects maximum heart rates are tested by porlar rs 400 when they do each movement for 5 minutes continuously with 3 minutes interval between the movements so that HR recovered almostly.

3 RESULTS AND DISCUSSION

HR is considered to be a sensitive and noninvasive index for exercise intensity and metabolism level. HR of water exercise is usually lower than land exercise because of the buoyancy and resistance of water and the speed of movement (MaryBeth Pappas Baun,2007).

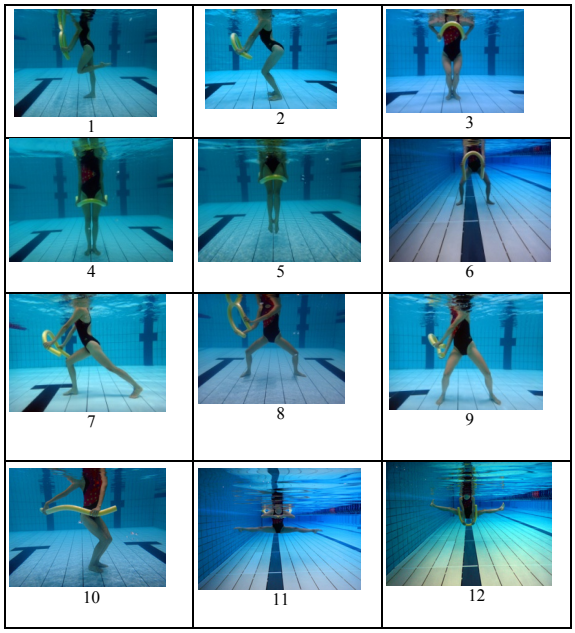

Figure 1: Diagram Sketch of the the 14 selected noodle exercises.

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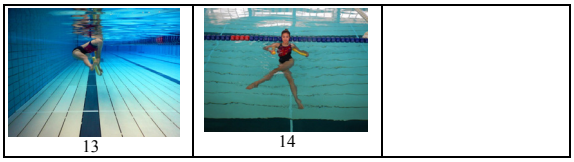

Figure 1: Diagram Sketch of the the 14 selected noodle exercises. (cont.).

HR for the 14 movements range between 108±11.40 to 138±15.40 beat/min, which indicates all the exercises are under aerobic intensity and are beneficial for cardiovascular fitness. The highest HR happened when subjects jumping in large range and pressing down or pushing forward noodles with arms, with mean HR located above 130 beat/min. When the subjects press noodles while striding or running, mean HR are between 120 to 130 beat/min. When subjects press noodles with standing or floating position, HR range from 110 to 120 beat/min. All the works can be divided into 3 groups, high intensity group, medium intensity group and low intensity group.

Table 2: Subjects' mean HR during the test for 14 works(N=8).

No.	motions	HR
1	Press lifting	138±15.40
2	circle lifting	136±12.37
3	press jumping	134±13.92
4	circle lunges	128±12.51
5	circle part jumping	127±20.53
6	bunny jumping	122±17.91
7	push jogging	121±17.08
8	push jumping	119±17.35
9	lifting legs	118±11.83
10	waving	116±10.07
11	scooping	116±10.36
12	scissors kicking	114±11.33
13	press squatting	110±14.28
14	push squatting	108±12.61

Table 3: Classification of the 14 movements.

	movements	HR zone	feature
High intensity	Press lifting; circle lifting; press jumping	Above 130	Jumping vigorously
Medium intensity	circle lunges; circle part jumping; bunny jumping; push jogging	120-130	Striding or jogging
Low intensity	push jumping; lifting legs; waving; scooping; scissors kicking; press squatting; push squatting	110-120	Standing or floating

5 CONCLUSIONS

Intensity of water noodle exercises increases when leg jumping vigorously with arm pressing noodles. Intensity of exercises in floating position is relatively low but good for injury prevention and rehabilitation. All the pressing and pushing movements are executed by pectoralis major and bending muscles of arm, where latissimus dorsi and extension muscle are not recruited thoroughly, which indicates that further attention should be paid in designing exercises.

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