

CONTROL DIFFERENCES BETWEEN TWO SCISSORS KICK STYLES

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KATHYRN ROSE HUNTZINGER

B. S., Kansas State University, 1972

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973

Approved by:


Major Professor

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Approved by Supervising Committee

William B. Zuti
Richard J. Ch.

ACKNOWLEDGEMENTS

Acknowledgement and appreciation are given to Dr. John Merriman for his advice and encouragement. Also thanks is given to Dr. Janice Sanner, Mr. John Bolan and Mrs. Cindy Fox for their part in judging and rating the subjects. Without their cooperation and willingness to cooperate, this study could not have been completed.

Many thanks are expressed to the subjects whose patience and contributions went beyond class requirements. Appreciation is also given to the members on the research committee, Dr. Richard Akins, Dr. William Zuti, and to the Head of the Physical Education Department, Dr. Charles Corbin.

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Chapter 1

INTRODUCTION

Many aquatic instructors are content to use the same methods year after year on the basis that what worked last year will work again. Other instructors do not accept personal opinion as a sound evaluation of existing methods. Aquatic experts, MacKenzie (12) and Wallach (13), have challenged researchers to replace aquatic methods based on opinion with methods scientifically examined and based on substantive evidence.

In a paper on needed research in aquatics presented to the National College Physical Education for Men, MacKenzie (12:109) asked several questions concerning aquatic instruction. The question, "What professional preparation is necessary for lifeguards?" is an example. Such questions need answers based on extensive research that will hold up from year to year. Even fundamental questions such as why some methods work better than others need to be answered with valid evidence. The following statement by MacKenzie (12:109) illustrates the importance in finding scientific answers to questions rather than relying on opinion:

Fundamental questions have been raised emphasizing the relative lack of teaching sophistication of aquatic personnel. Until answers are found, the teaching of swimming and other aquatic sports will continue to exist in the realm of opinion rather than being founded upon substantive evidence.

Instructors of Water Safety and Lifeguarding have also been challenged by Leonard Wallach. Wallach (13:101) expressed the need for developing and testing reliable skills rather than just accepting the skills because some instructors use them. He made the challenge that, "It is easier to dilute a subject area with too many personal opinions; yet it is hard to teach something that just doesn't hold up to scientific examination."

The American Red Cross and the YMCA are two main organizations which provide courses in water safety and lifesaving. There is no indication that the methods presented in either of the courses are founded upon any research other than the opinion of former teachers. The American Red Cross lifesaving text has not had a substantial revision since its first printing in 1938. In the preface, the text states that methods of preventing drownings and saving lives were discovered and evolved by their volunteer instructors and national staff as their knowledge and information grew. No mention is made in the text of research as a basis for writing the text or in selecting the methods presented.

In contrast to the American Red Cross, the YMCA has made efforts to meet the challenges to upgrade aquatic instruction. The YMCA has redesigned their entire aquatic program. A new philosophical approach to teaching is being used but the skills which are taught have remained the same. (Arnold, 14:190). YMCA directors did not feel various Senior lifesaving courses trained qualified lifeguards so a committee was formed and a new training program was devised. (Cornforth, 15:78). Although the YMCA has made needed changes in

their program, no tests other than time and opinion have yet been presented to substantiate the use of existing methods or skills.

One answer to the challenge of providing scientific evidence for selecting and using lifesaving methods may be in testing the control different methods provide. Control is defined as the ability of the rescuer to restrain the panicky reactions of the victim while making a safe rescue. Control is stressed as a safety factor in using the methods presented by the American Red Cross. If a rescuer does not have control over his victim, the rescue may result in a double drowning. Only methods proved to provide the greatest degree of control should be taught and used. A scientific basis of evaluation is needed to determine what degree of control is present in the methods now taught and used universally.

The purpose of this study included providing an evaluative means to determine control differences between the two scissors kick methods employed in the cross chest carry. By evaluating and revising aquatic lifesaving methods such as those involving control, answers can be found to provide a scientific basis. Research can make the professional preparation of lifeguards more sophisticated and in turn cause man to become more "panic-proofed" in water. Empirical evidence is not sufficient when attempting to prevent a drowning by use of a swimming rescue.

STATEMENT OF THE PURPOSE

The purpose of this study was to ascertain the extent of control in the cross chest carry when using the inverted scissors kick as compared to the regular form of the kick.

LIMITATIONS OF THE STUDY

The underwater evaluation may have been affected by the cloudiness of the water caused by chemicals.

DELIMITATIONS OF THE STUDY

Subjects chosen for evaluation were limited to college age lifesavers trained with American Red Cross methods. Experts to make the evaluation included four authorities on the cross chest carry. The evaluation was limited to the two scissors kick styles.

Chapter 2

LITERATURE REVIEW

The literature written on the sidestroke and its use in making swimming rescues is primarily found in swimming and water safety textbooks. No references were made in any of the textbooks to research used in selecting the best form of the sidestroke kick. Although the older texts (Tourney, 10) generally agree on the regular form of the kick for teaching beginners, the inverted form is accepted by most for carrying drowning victims. A few of the textbooks do present reasons for changing the kick to carry victims. More recent textbook editions present both kick styles with no indication as to which is best. The need for research to base selection of methods has been expressed at National Conferences and meetings.

Clayton and Tourney (3:153) suggest that one reason for not using the regular scissors kick for carrying a victim is because, "The usual scissor kick tends to become tangled in the legs of the victim during a cross chest carry..." In other words, the rescuer tends to kick the victim. Therefore the selection of the inverted method by Clayton and Tourney is based on a tendency. No answers are given in the text as to how this tendency was discovered or evaluated.

Bunn, in agreement with the use of the inverted kick for carrying a victim, also presents the reason that the inverted kick avoids interference. He states, "If the swimmer is towing someone the bottom

leg should be forward to avoid interference." (2:212). By kicking the bottom leg forward the inverted kick is used.

The rescuer is instructed in a text by Robertson and Russell to change his swimming side to invert the scissors kick. The authors suggest that, "The kick may be inverted so that the victim will not obstruct the leg drive..." (7:81). McAllister also supports the inverted kick but for a slightly different reason. She favors the inverted kick because of the backward-lying position the rescuer assumes when the top leg is kicked backward. This position permits the rescuer to make a deep and forceful kick during the rescue. (6).

In three other texts by Marjorie M. Harris (5:71), Vannier and Poindexter (11:209), and John A. Tourney, Jr. (10:113), the inverted kick is recommended. However, no reason is presented as to its merit over the regular kick. John A. Tourney, Jr. suggests that the reason the inverted kick is not taught to a beginner is because it is more difficult to teach than the regular kick. Again, the statement seems to be based on opinion only.

The American Red Cross Water Safety and Life Saving text gives rescuers a choice between the two kicks. (1:133-134). The text suggests that a swimmer learn the inverted kick on one side so that when he changes sides when he gets tired, he will be using the same motion only in the form of the regular kick. The text also indicates that when using the inverted kick there is a tendency for the rescuer to roll slightly onto his back, whereas the regular kick enables the rescuer to lie "squarely on his side." By rolling onto his back, the rescuer may shift the victim's body to the front of his own, leaving

no support for the victim to ride on. With the rescuer and victim in this position, it is the opinion of the researcher that the rescuer has less control over his victim compared to the regular kicking position.

Other organizations which provide life saving instruction based on the same text used by the Red Cross include the Boy and Girl Scouts of the United States of America. Both organizations accept the American Red Cross Certificates for meeting the requirements in earning merit badges. The Boy Scouts do however, use a different text which consists mainly of a checklist of skills without all the background and explanation presented in the American Red Cross textbook. (18)

Both kick styles are also presented in the Aquatic Guide written by the DGWS Aquatic Guide Committee 1965-67. (16:28). Equal consideration is given to each kick with no preference given or inferred. Hanneman includes both styles in her text also but suggests the inverted style be learned first and followed with the regular kick. (4:133-142).

The only research found was a survey taken at Springfield College on 797 freshmen to reveal their kick preference. (Silvia 8:37). The survey data indicated that 366 of the 797 freshmen or 45.92 percent preferred the regular kick on the right side. The regular kick on the left side was preferred by 210 or 26.35 percent. A fewer number of 143 preferred the inverted style on the right side or 17.94 percent. Only seventy-eight or 9.97 percent preferred the inverted kick on the left side. Although this survey showed a preference for the regular kick, Silvia gives both forms of the kick with no indication as to which form is better. This text by Silvia is used by the YMCA throughout the United States.

Recently the YMCA developed a new lifesaving and water safety program. In the 1971 May-June issue of the Journal of Physical Education, Margret Kelso wrote an article describing the new program. Basic and advanced water safety courses were added to the existing lifesaving program. The new parts of the program were designed to improve personal water safety rather than teach active drowning rescues. (17:192).

Almost a year later the same journal included an article by James Cornforth on replacing the Senior Lifesaving course with a program to better train lifeguards. Cornforth stated that many YMCA aquatic directors have expressed the opinion that the graduates of various lifesaving courses are not qualified to be lifeguards. Cornforth stated that, "These certified Lifesavers may come highly credentialed in personal safety skills but there is still much to be learned if they are expected to work as a lifeguard." (15:78). A committee was formed and a program was developed to train and certify lifeguards. As a member of this committee, Cornforth described the program in his article. He made no reference to any research which may have been used by the committee in developing the new program.

In a personal letter to the investigator of this study (Appendix C), Cornforth expressed his personal feelings as to which kick he preferred for swimming rescues. He believes the inverted kick prevents the victim from being kicked with the rescuer's heel but agrees that the regular kick could be used just as effectively. "Preferences such as this are probably established in a person's early training such as their first lifesaving course," Cornforth suggested.

The new book, to be released in the spring of 1974, on the National YMCA Lifesaving program will have both forms of the scissors kick presented. Again no research is referred to in the letter, and text material from the book is unavailable at this time.

Another letter in response to which scissors kick the YMCA preferred to teach was written by James Welch, Aquatic Commissioner for the Y Mid-America Region. Welch also agreed that both kicks could be effective but personally preferred the inverted style. A new reason was given by Welch for preferring the inverted kick. In his opinion, Welch stated that, "The inverted scissors provides greater trunk rotation and less potential entanglement of victim and rescuer's legs." (Appendix C).

When aquatic personnel attend conferences to discuss existing programs and problems, they are encouraged to base new ideas on substantive evidence. At the 1962 meeting of the National College Physical Education Association, MacKenzie suggested that answers to questions concerning aquatic instruction be found through the use of research rather than opinion. A question such as, "What standards of competence should be required for lifeguards employed at beaches?" (MacKenzie, 12: 109) needs an answer that is tested and not just accepted because of general opinion.

At the 1971 conference on Professional Standards in Aquatics and Approaches to Certification, Wallach encouraged water safety and lifeguarding instructors to test and examine skills. Wallach expressed the need for developing and testing reliable skills instead of accepting old ones because they worked for some instructors. Depending on

personal opinions as excuses for what is taught is easy. But Wallach warns instructors that, "It is hard to teach something that doesn't hold up to scientific examination." (13:101).

The literature reviewed primarily supports the inverted kick, although both scissors kick styles are recommended by some authors. A few references present opinionated reasons for preferring the inverted style but no research or evaluation has been conducted to determine its merit over the regular style. The general reason for selecting the inverted style was that it avoids interference. Although the texts prefer the inverted kick, the survey presented by Silvia indicates students prefer the regular kick. (8). Recent revisions in lifesaving courses stress both styles indicating that the choice should be individual based on individual characteristics. Although either kick may be better for different people, MacKenzie and Wallach express the need for research in evaluating lifesaving and water safety methods so that the choice will be made between two tested and reliable skills. (12) (13).

Chapter 3

PROCEDURE

College students trained with American Red Cross lifesaving methods served as subjects for the study. The subjects included nineteen girls and fourteen boys although the data was not treated by sexes. The investigator saw no reason to differentiate between sexes because the two kicks are performed mechanically the same for both sexes.

Each subject was observed and rated while he carried another subject approximately twenty yards. The subjects were instructed to use the regular kick for the first evaluation, and then change to the inverted kick for the second one. The subjects were encouraged to swim on the side which felt the most comfortable and strongest. Each subject was allowed to choose his own victim.

As the subjects swam past the judges, the victim's position in relation to the rescuer's hip was observed. The observations were made in the water with the use of snorkels and face masks. Each judge was assigned a recorder who recorded the judge's evaluation on a rating sheet. A copy of the rating sheet can be found in Appendix B.

A maximum of five points checked on the rating sheet indicated that the victim was directly over the rescuer's hip and under complete control. As the victim moved to either side of the rescuer's hip, points were subtracted from the maximum score of five. Movement to

the back of the rescuer's hip scored negative points whereas movement to the front of the rescuer's hip scored positive points. Positive and negative signs indicated direction only and did not affect point values. A +3 was equal to a -3.

Movement to the back of the rescuer was not considered as undesirable as movement to the front. If the victim slipped behind the hip he could still ride on top of the rescuer but if he slipped to the front, he rode alongside the rescuer with no support underneath. Therefore a negative one score was omitted from the rating sheet based on the opinion that the victim riding behind the rescuer was not as serious a loss of control as when riding in front.

The directions on the rating sheet did not account for kicking the victim by the rescuer whatever the position of the victim on the rescuer's hip might be. For this reason the recorders were instructed to place a K by their checkmarks to indicate the rescuer had kicked the victim. When a rescuer kicks his victim, his control over his victim may be impaired. The victim may tend to panic more if kicked. Also the forward progress of the rescuer may be slowed if his legs are stopped by the victim's body or legs. To avoid this type of interference was the main reason most swimming texts support the inverted scissor kick. Because kicking the victim is related to the extent of a rescuer's control, one point was deducted from each score with a K beside it.

Evaluation of each subject's performance was made by four judges picked for their expertise and depth of background in aquatics. All had attended National Aquatic Schools and two were members of the

National Aquatic Council of AAHPER. The two men judges were Water Safety Instructor Trainers and the two women judges held the title of Water Safety Instructor. Experience with Red Cross work ranged from eight years to twenty-five years.

At the time the first group of twenty students had completed the lifesaving course, four of the judges were available. When the second group of thirteen terminated their course only three judges were present. Each subject received two scores from each judge. One score for the regular kick and one for the inverted kick was recorded. This gave each subject four scores in the first group and three in the second.

The four or three scores for each subject's performance of each kick were totaled and averaged to compute a mean score for each kick style. Mean score differences were later used in a t-test for correlated samples to determine the difference in control between the two kick styles. The scores marked with a K were first calculated without a one point deduction for kicking the victim. A second t-test was made with the one point deduction for each K recorded. Actual scores are shown in Appendix A. For the purpose of this study a priori for significance was set at .05.

A simple comparison between the number of positive and negative scores for each kick was made to determine if there was a difference in the general position of the victim during each kick. Positive and negative score totals were used to find expected frequencies of positive and negative scores for each kick style. The frequencies were then tested with the Chi Square test of Independence to determine if

a significant difference existed between the two kick styles. A priori of .05 was set for determining significance. Also the number of K's recorded for each kick style was noted and compared.

A small survey was conducted with the last group of thirteen to reveal the preferences of the subjects for either kick. Each subject was asked to write on a slip of paper which kick style he preferred on which side. The survey was suggested by one of the judges after the evaluation had terminated. Only the second group of subjects were available to express their opinions.

Chapter 4

DATA ANALYSIS AND RESULTS

The purpose of this study was to determine whether a rescuer had more or less control over his victim with the use of the inverted scissors kick as compared to the regular scissors kick. Table 1 illustrates the statistical results of the mean and difference totals for each kick style.

Table 1

Computed Mean and Difference Totals Comparing Regular Kick Control with Inverted Kick Control

	Mean Total	Dif. Total	Dif. ² Total	\bar{D}
Regular Kick	144.2			
Inverted Kick	136.7	7.5	21.865	.227
n = 33				
Significant t .05, df 32, = 2.035				
Computed t = 1.6429				

The computed t ratio was 1.6429 and the initial t for indicating control differences was 2.035. (Snedecor, 9:549). This indicates that there is no significant difference between the two kick styles in the degree of control ($P = .05$).

Another t-test was made with the statistical data from the scores with a one point deduction for kicking the victim. The summary of this test is shown in Table 2.

Table 2

Computed Mean and Difference Totals Comparing Regular Kick Control to Inverted Kick Control Minus One Point for Kicking the Victim

	Mean Total	Dif. Total	Dif. ² Total	\bar{D}
Regular Kick	139.9			
Inverted Kick	127.6	12.3	31.76	.37273
	n = 33			
Significant t .05, df 32, = 2.035				
Computed t = 2.325				

The computed t ratio was 2.325 and the initial t for indicating control differences was 2.035. (Snedecor, 9:549). Significant difference was indicated at the five percent level. Therefore the results were interpreted to mean that the regular scissors kick enabled the rescuer to have more control over his victim than the inverted kick permitted when kicking the victim was considered as part of the control factor.

The number of times the victim was kicked when the rescuer was using the regular kick totaled fifteen and the inverted kick totaled thirty-three. These totals indicate that more interference due to kicking the victim is created with the use of the inverted kick than during the regular scissors kick. This fact contradicts the reason

given by many swimming texts for selecting the inverted kick to use with the cross chest carry. The inverted kick was generally chosen because it created less interference with the victim. Deducting one point from each subject's score for kicking the victim caused the control difference between the two kick styles to appear in the previously mentioned t-test for related samples.

Totaling the number of negative and positive scores for each kick presented a general indication of the victim's body in relation to the rescuer's. A Chi Square Test of Independence was used to determine if the position differed between the two kick styles. Score totals and a summary of the test is shown in Table 3.

Table 3

Computed Results of Chi Square Test Using
Positive and Negative Score Totals

	Positive Scores		Negative Scores		Total
	Total	Frequency	Total	Frequency	
Regular Kick	27	23.94	24	28.5	57
Inverted Kick	30	28.56	44	34	68
Total	57 (42%)		68 (50%)		125 (100%)

Computed $\chi^2 = 2.0213$
Significant $\chi^2 = 3.841$ at .05, df 1

The computed χ^2 of 2.0213 is less than the significant χ^2 of 3.841 ($P = .05$) (Snedecor, 9:550). Interpretation of the test results indicate that there is no difference in control between the two kick

styles. The victim's position in relation to the rescuer's hip was used as the primary basis of control. This finding agrees with the first t-test results which indicated no control difference between the kick styles.

The results of the small survey conducted with thirteen of the thirty-three subjects revealed a divided kick preference. The conventional or regular style was preferred by six of the subjects and five preferred the inverted style. The remaining two subjects based their selection on which side they happened to be swimming on. On the left side the regular style was preferred and on the right, the inverted style.

Chapter 5

SUMMARY AND CONCLUSIONS

The two styles of the scissors kick, regular and inverted, were evaluated by four expert judges through the use of a rating sheet. Control was judged by the victim's body in relation to the rescuer's hip. The evaluation of the body relationship revealed no difference in control between the two kick styles. When kicking the victim was considered along with the body relationship, the control a rescuer had over his victim was greater during the regular kick. The rescuer had a greater tendency to kick his victim during the inverted kick. There was not a significant difference as to where the victim was riding on the rescuer during each kick.

Rationale for the Study

Water safety programs of the American Red Cross, YMCA, and other public service organizations present lifesaving methods based on no apparent scientific research. In making a swimming rescue the control a rescuer has over a panicked victim is very important for the safety of both persons. A scientific basis or evaluation is needed to determine the degree of control that lifesaving methods such as the cross chest carry permit.

MacKenzie (12:109) challenged aquatic instructors to provide substantive evidence on which to base method selection. This study was one approach to answering the need for verifiable evidence in the selection of which scissors kick style should be taught with the cross chest carry.

Related Literature

A paucity of research has been conducted to support the selection of lifesaving methods. The literature which has been written primarily exists in swimming textbooks. Support for the inverted kick was generally given by the texts for the reason that the inverted style avoids interference of the rescuer's legs with the victim's. None of the texts presented research as support for their selection of the inverted kick.

Although the inverted kick was generally accepted by swimming textbooks, a survey presented by Silvia (8:108) indicated that lifesaving students preferred the regular kick. Recent corrections of existing lifesaving courses included individual preferences by presenting both kick styles and suggesting the rescuer choose the best style for him.

To make this choice, a choice between tested and reliable skills, MacKenzie (12) and Wallach (13) each expressed the need for research. Both authors were concerned with providing more research to replace opinion as a basis for method selection.

Procedures

Thirty-three college students at Kansas State University served as subjects for this investigation. The subjects were trained with Red Cross lifesaving methods. Both scissors kick styles were judged and scored by four expert judges as the subjects carried a victim approximately twenty yards. The scores for each subject as he performed each kick were totaled and averaged. The averaged scores were used for statistical comparisons.

The t-test for related samples was used to determine the statistical difference of control between the two kick styles. Another t-test was made with the scores totaled and averaged after a one point deduction had been made from each score for the rescuer kicking his victim. A simple comparison was made between the number of times the rescuer kicked the victim during the inverted kick evaluation and the number of times the rescuer kicked his victim during the regular kick.

To determine a general relationship difference between the rescuer's body and the victim's during each kick the positive scores were compared to the number of negative scores recorded for each evaluation. The Chi Square Test of Independence was used to determine if the difference was significant.

A small survey was conducted with thirteen of the thirty-three subjects to reveal any kick preference between the two styles.

Findings

The t-test for related samples using the data from the rating sheets for comparing control differences between the two kick styles indicated the difference was not significant. A second t-test made with the data collected after one point was deducted for kicking the victim produced a significant difference in control between the two kick styles.

The number of times the rescuer kicked his victim was more than twice as great during the inverted kick evaluation as during the regular kick evaluation. Therefore the inverted kick was found to cause more interference in the form of kicking the victim than the regular kick. This finding contradicts the reason given by swimming texts that the inverted kick avoids interference.

The Chi Square Test of Independence showed no significant difference between the two kick styles when just the negative and positive score totals were used to determine a body relationship difference.

Discussion and Recommendations

Although the literature on the scissors kicks generally prefers the inverted kick style for carrying victims, this investigation discovered that no significant difference in control based on body relationship was permitted by either kick style. The common reason given by the swimming texts for selecting the inverted style was that it avoids interference. In contradiction to this theory, this study showed that the inverted kick caused more interference in the form of the rescuer kicking his victim than the regular kick.

The findings based on body relationship were not significant, but the control difference was significant when kicking the victim was considered. More interference or kicking the victim occurred during the inverted kick. Therefore this investigator recommends that the regular kick should be taught in life saving courses. If time permits the inverted kick could be introduced to give anyone having difficulties a chance to see if he may be better suited to the inverted kick style.

Further study is recommended with larger sample sizes and underwater windows for observations.

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APPENDIX A

Table 4

Control Raw Scores Used for Statistical Comparisons

Subjects	Regular Kick				Inverted Kick			
	Judge 1	Judge 2	Judge 3	Judge 4	Judge 1	Judge 2	Judge 3	Judge 4
1	4	-4	5	2	5	5	-2	4
2	-4	-4	5	5	-4	5	-4	-4
3	5	5	-4	4	-3	-4	-4	4
4	-4	3	3	3	4	5	3	5
5	5	5	5	5	5	5	-3	5
6	5	5	3	2	5	5	5	5
7	5	5	5	5	4	5	-4	4
8	5	5	5	5	-4	-4	5	5
9	5	4	3	-4	5	5	5	4
10	5	3	-2	2	-4	5	5	5
11	5	5	5	-3	4	5	5	5
12	5	5	-3	5	4	4	4	4
13	-4	5	3	-4	4	4	3	-4
14	5	4	-4	-3	-4	5	3	-3
15	5	5	-4	5	-3	-4	-4	4
16	5	3	4	-4	4	3	4	3
17	5	3	5	5	-4	-3	5	5
18	5	5	3	4	3	4	-3	4
19	5	4	5	5	-4	-4	-3	-3
20	5	5	-2	-4	4	5	-3	5
21	5	5	-4		-4	5	-4	
22	-4	5	5		-3	-4	-4	
23	-4	5	3		-4	5	5	
24	-3	5	5		-4	5	5	
25	5	5	5		-2	-4	-4	
26	5	-4	-4		-3	5	5	
27	4	5	4		-3	-4	-4	
28	5	5	4		-4	5	5	
29	5	5	4		3	5	5	
30	-4	5	5		3	5	5	
31	4	5	4		-3	-4	-4	
32	5	5	5		4	4	4	
33	5	5	5		-4	5	5	

Table 5

Control Scores Minus One Point for Kicking

Subjects	Regular Kick				Inverted Kick			
	Judge 1	Judge 2	Judge 3	Judge 4	Judge 1	Judge 2	Judge 3	Judge 4
1	4	4	5	2	5	5	-2	3
2	-4	4	5	5	-4	5	-4	-4
3	5	5	-4	4	-3	-4	-4	4
4	-4	3	2	3	3	5	3	5
5	5	5	5	5	5	5	-2	4
6	5	5	2	1	5	5	5	5
7	5	5	5	5	4	5	-4	3
8	5	5	5	5	-4	-4	5	5
9	5	4	3	4	4	4	4	4
10	5	3	-1	2	-3	4	5	5
11	5	5	5	-3	4	5	5	5
12	5	5	-3	5	3	4	3	3
13	-4	4	3	4	4	4	3	-3
14	5	4	-4	3	-4	4	3	-3
15	5	5	-4	5	-3	-4	-4	4
16	5	3	4	-4	4	3	4	3
17	5	3	5	5	-4	-3	5	4
18	5	5	3	4	3	4	-2	3
19	5	4	5	5	-4	-4	-3	-3
20	5	4	1	3	3	5	-2	4
21	4	5	-4		-4	5	-3	
22	-4	5	5		-2	-4	-4	
23	-4	5	3		-4	5	5	
24	-3	5	5		-4	5	5	
25	5	5	5		-2	-4	-4	
26	5	-4	-3		-3	5	5	
27	4	5	4		-2	-3	-3	
28	5	5	3		-4	5	4	
29	5	5	4		2	4	4	
30	-4	5	5		3	5	5	
31	3	5	4		-3	-4	-3	
32	5	5	4		4	4	3	
33	5	4	4		-4	5	5	

Table 6
Control Mean Scores and Differences

Subjects	Mean Reg. Kick	Mean Inv. Kick	Difference	Difference ²
1	3.75	4	-.25	.0625
2	4.5	4.25	.25	.0625
3	4.5	3.75	.75	.5625
4	3.25	4.25	-1.	1.
5	5	4.5	.5	.25
6	3.75	5	-1.25	1.5625
7	5	4.25	.75	.5625
8	5	4.5	.5	.25
9	4	4.75	-.75	.5625
10	3	4.75	-1.75	3.0625
11	4.5	4.75	-.25	.0625
12	4.5	4	.5	.25
13	4	3.75	.25	.0625
14	4	3.75	.25	.0625
15	4.75	3.75	1.	1.
16	4.	3.5	.5	.25
17	4.5	4.25	.25	.0625
18	4.25	3.5	.75	.5625
19	4.75	3.5	1.25	1.5625
20	4.	4.25	-.25	.0625
21	4.6	4.3	.3	.09
22	4.6	3.6	1.	1.
23	4	4.6	-.6	.36
24	4.3	4.6	-.3	.09
25	5	3.3	1.7	2.89
26	4.3	4.3	0	0
27	4.3	3.6	.7	.49
28	4.6	4.6	0	0
29	4.6	4.3	.3	.09
30	4.6	4.3	.3	.09
31	4.3	3.6	.7	.49
32	5	4	1.	1.
33	5	4.6	.4	.16

Table 7
Means and Differences of Control Scores
Minus One for Kicking

Subjects	Mean Reg. Kick	Mean Inv. Kick	Difference	Difference ²
1	3.75	3.75	0.	0.
2	4.5	4.25	.25	.0625
3	4.5	3.5	1.	1.
4	3.	4.	-1.	1.
5	5.	4.	1.	1.
6	3.25	5.	-1.75	3.0625
7	5.	4.	1.	1.
8	5.	4.5	.5	.25
9	4.	4.	0.	0.
10	2.75	4.25	-1.5	2.25
11	4.5	4.75	-.25	.0625
12	4.5	3.25	1.25	1.5625
13	3.75	3.5	.25	.0625
14	4.	3.5	.5	.25
15	4.75	3.75	1.	1.
16	4.	3.5	.5	.25
17	4.5	4.	.5	.25
18	4.25	3.	1.25	1.5625
19	4.75	3.5	1.25	1.5625
20	3.25	3.5	-.25	.0625
21	4.3	4.	.3	.09
22	4.6	3.3	1.3	1.69
23	4.	4.6	-.6	.36
24	4.3	4.6	-.3	.09
25	5.	3.3	1.7	2.89
26	4.	4.3	-.3	.09
27	4.3	2.6	1.7	2.89
28	4.3	4.3	0.	0.
29	4.6	3.3	1.3	1.69
30	4.6	4.3	.3	.09
31	4.	3.3	.7	.49
32	4.6	3.6	1.	1.
33	4.3	4.6	-.3	.09

APPENDIX B

Control Check List

- 1 Rescuer kicks victim in front of his body
- 2 Victim rides completely in front of rescuer
- +3 Victim slides in front and then back during kick
- 4 Victim rides just in front of the edge of rescuer's hip
- 5 Victim's small of back rides on rescuer's hip
- 4 Victim slides behind rescuer's hip during kick recovery
- 3 Victim stays behind rescuer's hip during entire stroke
- 2 Rescuer kicks victim behind his body

[illegible]

Mr. James Cornforth
YMCA Senior Editor
Jackson, Michigan

Dear Sir:

I am writing a research thesis to determine whether the inverted or conventional scissors kick should be used with the cross chest carry in life saving. Your name was given to me by Mr. James Welch. If you could tell me which kick you prefer to teach with the cross chest carry in your liveguard training course and why you prefer it, you will help me in my research.

Thank you for your time and consideration. Any help you can give me is greatly appreciated.

Sincerely,
Kathy Huntzinger
Kathy Huntzinger

Dear Kathy:

Preferences such as this are probably established in a person's early training, such as their first lifesaving course. I have been indoctrinated to believe that the inverted method allowed a rescuer to tow a victim without constantly kicking the victim with the rescuer's heel.

However, if I close my mind to this prejudice, I can fairly well see that a regular scissors kick, performed by a strong and competent rescuer, could

be just as effective.

The National YMCA will be releasing a ^{new} book soon on their Lifesaving program. In the initial draft copies I have seen, there has been no reference to suggesting one kick style over another. The major emphasis seems to be, "Maintain forward movement."

I trust I've given you a broad and professional viewpoint. I hope the information is helpful. Good luck on your thesis.

Sincerely,

Steve LaPlante

Kathy Huntzinger
Grad. Assistant in PE
Kansas State University
Manhattan, Kansas

Dear Kathy:

I would like to refer you to: Charles M. Pead, Aquatic Commissioner, Northeast Region, 136 Main Street, Waterbury, Connecticut 06702. Mr. Pead is on the National Committee for research and development of the YMCA Lifesaving Program. Also, James Cornforth, YMCA, Jackson, Michigan. Mr. Cornforth is Senior Editor of the YMCA's New Lifeguard Training Course.

My personal feelings on the two kicks are probably not unique. The Inverted Scissors provides greater trunk rotation and less potential entanglement of victim and rescuer's legs. However, I cannot condemn any individual for using a regular scissor kick, if he is more effective with that type of a kick. To me the argument is knit-picky.

Sincerely,


James L. Welch

JW/pw

FORM 247 10M 5-71



GIRL SCOUTS OF THE UNITED STATES OF AMERICA

830 Third Avenue, New York, N. Y. 10022

Date 11/22/72

Dear Kathy:

Girl Scout life saving courses are generally given by qualified Red Cross instructors using their recommended methods. Good luck with your paper.

Sincerely,



Nancy E. Fisk, Program Specialist
Program Department

VITA

Kathyrn Rose Huntzinger
Born March 29, 1950, Manhattan, Kansas
Married Floyed Huntzinger June 26, 1971

Educational Experience:

Graduated from Manhattan, Kansas, High School May 22, 1968
Graduated from Kansas State University with a Bachelor of
Science degree May, 1972
Major: Physical Education
Minor: Biological Science

Occupational Experience:

1972-1973 Graduate Assistant, Kansas State University
Swimming Instructor summer 1973, Manhattan, Recreation
Commission
1973-1974 Physical Education instructor, girls' volleyball,
basketball, and track coach at Luckey High School,
Manhattan, Kansas

Professional Affiliations:

Associate member of Delta Psi Kappa at Kansas State University
Member of Delta Psi Epsilon

CONTROL DIFFERENCES BETWEEN TWO SCISSORS KICK STYLES

by

KATHYRN ROSE HUNTZINGER

B. S., Kansas State University, 1972

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973

The regular scissors kick was compared to the inverted kick to determine if a control difference exists between the styles when used for towing a victim in the cross chest carry. Subjects for the study included thirty-three lifesaving students trained with American Red Cross methods at Kansas State University. Each kick was performed by the subjects as they carried a victim approximately twenty yards. Control was determined by the relationship of the victim's body to the rescuer's hip. The relationship was rated on a rating sheet by four experts using underwater observation.

Data collected from the rating sheets indicated varying results. When just body relationship was considered, no significant difference between the kicks was discovered. Deducting one point from each score for the rescuer kicking his victim produced a significant difference favoring the regular kick as having more control. Kicking the victim occurred more frequently during the inverted kick.

The findings by this study that the inverted kick caused more interference than the regular kick contradicts the literature reviewed which generally supports the inverted kick because it avoids interference. Although the findings based on body relationship alone were not significant, the control difference was significant when kicking the victim was considered. Therefore the study concluded that students should be taught the regular kick first, and then if time permits, be introduced to the inverted style. The findings of this study support the regular scissors kick as having more control and less interference with the victim.