

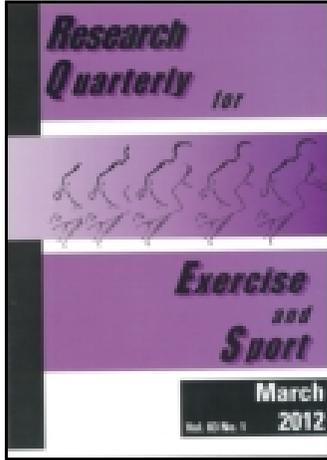
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# Some Facts on Swimming Cramps

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*(Submitted for publication May, 1949)*

**M**OST opinions about swimming cramps are based on physiological theory or personal experience. It appears desirable to examine the occurrence of cramps while swimming as they actually appear in a college swimming program for men. Exhaustive analysis of the causes of swimming cramps is beyond the scope of this paper, and the primary objective is to cast more light on the following questions:

1. How frequently do cramps occur while swimming?
2. Are cramps more likely to occur in swimming classes held immediately after a normal meal?
3. Does swimming ability have any bearing on their occurrence?
4. Are fat folk as susceptible as thin ones?
5. How disabling are they?
6. Can cramps be eliminated or minimized in the water?

## PROCEDURE

From June, 1945, to June, 1946, there were about 1,400 students enrolled in the required swimming class at Georgia Tech. They swam twice a week for about eleven weeks per term, so that, as a group, they amassed a total of about 30,000 man-hours in the water during the one-year testing period. All classes had identical work and identical instruction except in regard to the prevention of cramps. It is our experience that cramps can usually be anticipated from a fraction of a second to several seconds before they actually occur. This is called the "prodromal" state, and is usually heralded by a premonitory twinge. If the affected muscle is fully extended immediately after the warning twinge the total cramp will be much less painful, and will disappear much sooner than if only the traditional corrective procedures of rubbing and kneading are followed. We alternated instruction, teaching one class the preventive and the corrective procedures, and the next class only the corrective procedures.

### *Sample Record Card*

NAME	Jones, T. L.	Hour	(8:30)
Fat	Plump—(Average)	Thin	Skinny
Preventive	(Corrective)		
Water	80	Temperature	86
Location	Pectoral	Air	
Duration	Painful 0	Annoying	5 min.
Return	no		
Swim ability	Good (Average)	Poor	

## RESULTS

*Frequency of Occurrence.*—A total of only 63 cramps occurred during the entire year. Thirty of these occurred in the group taught to correct the cramp, and 33 occurred in the group taught to prevent the cramp. In view of the fact that one of our swimming tests requires that the swimmer remain in deep water for forty-five minutes with wrists tied behind the back, and another, for the same length of time with the legs tied to the waist, Buddha style, conditions were probably more conducive to the development of cramps than would occur in normal recreational swimming.

*Disability of Cramps.*—Not one of our swimmers was forced to the side of the pool because of cramps. We stress the desirability of learning to handle cramps in the comparative safety of our pool, rather than waiting until one is facing a real emergency on his own, in the ocean. Our better swimmers take a maximum inhalation, then place their faces in the water, the better to pay undivided attention to the rapid elimination of the cramp. Our poorer swimmers swim on their backs while working on the muscle. They do this because it enables them to remain in direct contact with the air, in spite of the increased probabilities of nosefuls of water.

*Muscles Involved in Cramping.*—Grouped by frequencies cramps appeared as follows: 31, calf; 8, foot; 5, forearm; 4, hand; 4, quadriceps; 4, hamstrings; 2, triceps; 2, pectorals; one, neck flexor; one, gluteal; one, biceps. These figures total 63.

*Stomach Cramps.*—As an interesting sidelight we have made it a practice to ask at all of our classes if any student had ever had a stomach cramp *while swimming*. To date, after questioning over 10,000 boys, we have not encountered one person who has had one, or one person who claims to have actually seen one. There have been a few who "knew a person who knew a person," etc.

In many years' experience with swimming and swimming men the writer has never seen one nor met a dependable swimming man who has seen one. This is amazing, to say the least, in view of the large number of drownings allegedly caused by stomach cramps. Only a very brave diagnostician would dare to try to differentiate between indigestion, heart failure, skeletal cramp, stomach cramp, choking on water or regurgitated food, simple lack of swimming skill, and a host of other things which produce a common ending—drowning, or a near drowning.

It is true that abdominal cramps may make breathing difficult and possibly painful, but proper use of the arms and legs in the water will get the face out, and from then on the swimmer is in the same position as the man who gets cramps on land. It is so easy to diagnose any difficulty in the water as "stomach cramps," and so few competent observers have the opportunity to collect evi-

dence, that it seems safe to say that there is little proof that stomach cramps are a hazard in swimming, and that many other factors are much more likely suspects. It appears probable that we have been perpetuating, unthinkingly, an invention of newspaper writers, which is no more than a notion, educed by untrained observers, based on the flimsiest of evidence.

*Prevention or Correction.*—Anticipating the total cramp (after the warning twinge) and stretching the affected muscle *before* it shortens, eliminates practically all of the pain, and much of the probability of return. A total of 27 out of 33 of those who anticipated the cramp had no pain, but 30 out of 30 of those who allowed the muscle to cramp before working on it had real pain. A total of 24 out of 33 “anticipators” had no return, and 15 out of 30 who allowed it to cramp had no return.

*Degree of Pain.*—Anticipating the total cramp made the average “annoying” duration a little less than three minutes, with the “painful” cramps lasting less than a minute. Failing to anticipate it and acting accordingly made the average painful phase nearly four minutes, and the average annoying phase nearly eight minutes. “Painful” may be defined as that period when the swimmer is *sure* that he would be better off on the side of the pool than in deep water, and “annoying” is that period when there is some interference with sustaining or progressing motions. Such figures are so subjective as to be valueless in themselves, but are of considerable value in emphasizing prevention.

*Water Temperatures.*—Cramps occur as follows in the various water temperatures:

Degrees	78	79	80	81	82
Cramps	1	4	26	24	8

While it would have been very interesting to introduce a wide range of water temperatures, the effect of either unduly high or low temperatures on the whole aquatic program would have been undesirable. Our pool gets very heavy use from physical training classes, varsity teams, and recreational swimming, and we have found it best to keep the temperature at 80 or 81 degrees to please the greatest number of persons. Ninety percent of the time the water will be at this temperature, with occasional drops down to 78 or increases up to 84, usually corrected in a few hours.

*Influence of Fat on Cramping.*—According to the very subjective classification system we used, the distribution was as follows:

<i>Classifications</i>	<i>Fat</i>	<i>Plump</i>	<i>Average</i>	<i>Thin</i>	<i>Skinny</i>
Cramp frequencies	1	14	20	24	4
Cramp frequencies by percentages	1.5%	22.2%	31.8%	38.1%	6.3%
Classification percentages in general student population	3%	15%	45%	31%	6%

It is regrettable that we did not use the Sheldon Somatotyping Technique for this data, although our total number of cramps is so small that probably no valid conclusions can be drawn to justify positive statements.

*Influence of Swimming Ability on Cramps.*—Swimming ability affects cramps as follows:

<i>Classifications</i>	<i>Good</i>	<i>Average</i>	<i>Poor</i>
Cramp frequencies	12	34	17
Cramp frequencies by percentages	19%	51%	37%
Grade distribution in whole class	36%	46%	18%

With all manner of objectives to choose from such as speed, strokes, lifesaving, etc., and with swimmers developing at different rates during the course, it is very difficult to evaluate their ability accurately. We use their final alphabetical grades as standards, considering AA and A as good, B or C as average, and D or F as poor.

*Air Temperatures.*—Our poor heating system produces rapid fluctuations with very wide variations from water level to ceiling. These temperatures were taken six feet above water level.

Air temperatures	80	83	85	86	87	88	94	95	100
Cramp frequencies	6	11	10	16	4	2	3	1	1

*Swimming after Eating.*—Cramps occur after eating as follows:

Class hour	8:00	9:00	10:00	1:00	2:00	3:00
Cramp occurrence	7	14	10	11	5	16

Even swimming a mile with clothes on, or treading water with hands tied behind the back for forty-five minutes, produced no appreciable effects from swimming immediately after eating. This was particularly interesting, as questioning shows that our college freshmen eat about the same meals as the average beach crowd with much emphasis on hotdogs, hamburgers, etc. We advised no change in eating habits except preceding an event like the 300-yard swim for time. For this event much nausea was avoided if swimmers skipped the preceding meal, regardless of the class hour. No nausea at all occurred in the swimming classes except in connection with the 300-yard swim for time.

### CONCLUSIONS

1. Cramps are not very likely to occur under usual indoor bathing conditions, and are of little importance to a trained swimmer unless speed or power is required.

2. Anticipating a cramp and stretching the threatened muscle *before* it has time to shorten will make the swimmer much more comfortable in the water.

3. The majority of swimming cramps will probably occur in the calf of the leg, and the remedy is to straighten the knee and hook the ankle.

4. Stomach cramps are probably greatly overrated as a factor in drowning.

5. There is little evidence that the amount of fat has any bearing on the development of cramps while swimming, as practiced at Georgia Tech.

6. Swimming ability is apparently not much of a factor, though our scanty data indicate that poorer swimmers are slightly more likely to get cramps than better swimmers.

7. Minor variations of water temperatures within the range of 78 to 82 degrees apparently have no effect on cramps, at least in indoor swimming.

8. Swimming directly after meals has no harmful effects on college indoor swimmers except when speed swimming is required.