

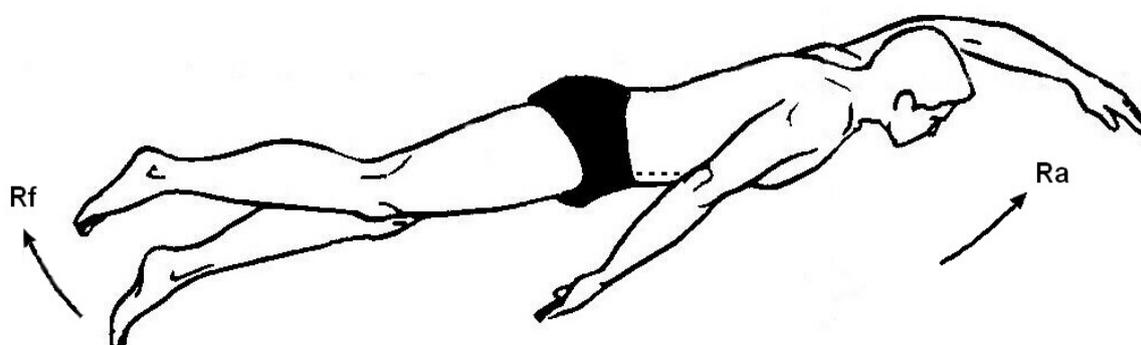
Swimming After Abdominal Surgery

Some Basic Anatomy

Almost everyone will have seen either a skeleton or a picture of one, and will be aware that the major motor muscles of the arms are attached to the upper part of the torso, and those of the legs are attached to the pelvis. The only skeletal connection between the two is the spine, of which the lower part is, or should be, fairly flexible. When we stand up, we are prevented from collapsing in a heap by the postural muscles in the vicinity of the waistline: the muscles of the lower back, the obliques at the sides, and at the front the *rectus abdominis*.

How Swimming Affects the Body

Swimming is often recommended as a thoroughly safe exercise to undertake after surgery, but it needs to be approached with caution. It is actually quite a complex piece of bio-mechanics which appears to have received less study than it deserves. The muscle with which colostomates are principally concerned for maintaining the mechanical integrity of the abdomen and preventing a hernia is the *rectus abdominis*, popularly known as the "abs", which runs in the front of the body from the lower part of the rib cage to the pelvis. When swimming in the prone position, all the downward and backward forces applied by the arms, and the downward forces applied by the legs, have to be resisted by the *rectus abdominis*.



To understand what is happening to the body when swimming, it is necessary to consider the forces which the water exerts on the body, rather than the forces exerted by the body on the water. Referring to the above illustration of a front crawl swimmer, the arms push down and back, so the resistance of the water gives rise to a reaction on the arms, R_a , forwards and upwards. In the same way the legs are alternately pushing down, so that there is a reaction, R_f , upwards. Depending on the skill of the swimmer, and the angle of the feet, R_f may be upwards and forwards, or upwards and backwards, but the predominant component is upwards.

In the absence of any controlling force, it will be evident that these two reactions, R_a and R_f , would have the effect of folding the body upwards like a penknife, with a hinge at about waist level. This can only be prevented from happening by tension in the *rectus abdominis*, represented by the dotted line in the illustration. Although the details of the forces concerned vary, this effect is common to all the strokes swum in the prone position.

Sport After Surgery

In the absence of a surgical or medical problem, you are almost as strong, or as weak, after stoma surgery as you were before, because there would normally be no need to cut a muscle

fibre, although a loss of strength of some 5% per week of inactivity must be expected. Without knowledge of an individual's fitness before surgery, recommendations are bound to be on the safe side, and fitter individuals might consider the basic abdominal exercises recommended for the average convalescent to be a waste of time. Nevertheless, they would be well advised to progress through a programme of sit-ups, if for no other reason than to obtain a measure of their own fitness. I was accustomed to lifting weights well over 100Kg, and I was back in the gym only a few weeks after an APR, but someone less active would be in a very different situation. With the *rectus abdominis* having an important part to play in the performance of swimming strokes, enthusiastic swimmers should aim to pursue their retraining at least up to sit-ups on a board sloping at 45°. If intending to return to competition, progressing to working on the 45° board, with weights (up to 10Kg) held at shoulder level, would be highly desirable.

Front Crawl

It is not generally appreciated that a front crawl swimmer in competition is pushing the *rectus abdominis* almost to its limit. Accordingly, the initial advice on front crawl to a former competitive swimmer would be "Swim at warm-down intensity", to a recreational swimmer "Take it gently", and to both, the universal recommendation "Stop if it hurts". Power and speed can then be increased as the *rectus abdominis* is strengthened by exercise.

Breast Stroke

Breast stroke is in a similar category, partly because the lack of streamlining in the leg action means that there are intermittent reaction forces on the legs which have to be resisted. In this case, initial advice must be "Take it gently". Many recreational swimmers tend in the leg action recovery to draw the knees up under the body, with the result that the water is hitting two large vertical obstacles, and generating substantial drag forces. These forces can be minimised by aiming to lift the feet up towards the buttocks, rather than by bringing the knees under the body. Try also to keep the legs, with the exception of the feet, within the width of the body. It would probably be useful for a swimmer who is doubtful of his or her breast stroke action to request some advice from an instructor at the local pool.

Back Crawl

Back crawl has to be the initial recommendation for swimmers after abdominal surgery, because the reaction forces are resisted by the muscles of the lower back. The only caution for them, which applies to all swimmers, is to be careful how they stand up. The usual technique of vigorously taking up a tucked position, in order to enable the body to be rotated more easily from the horizontal to the vertical position, is best avoided, and the advice should be "Stand up slowly". The problem in your local pool might be a reluctance to set aside a lane for back crawl swimmers, but if that is the case it might be worth while having a word with the manager. The Institute of Recreation Management stress that provision should always be made to accommodate the needs of colostomates, including private changing facilities, and if the muscular consideration is explained, the pool should be willing to do something to help.

Butterfly

The basic advice for any colostomate after surgery who wishes to swim butterfly is "Don't". It wouldn't be too much of an exaggeration to say that this stroke is swum with the *rectus abdominis*, and it can't be done gently. When you can do thirty situps in the gym on a bench inclined at 45°, without difficulty, then go back to butterfly, but not before. It would also be desirable first to introduce into your swimming sessions some dolphin kick legs-only work. In case you feel that this would be inexpressibly tedious, try doing widths (or even lengths) of

“individual medley”: kicking on the front, on the left side, on the back, and on the right side.

Other Water Exercise Activities

Apart from swimming strokes, enthusiasts will probably be interested in starts and turns. The fundamental principle must be to consider what use you are making of the *rectus abdominis*. Starts should be no problem, because the action is invariably one of straightening out, but every turn involves a tucked position, which has to be taken up briskly to enable a good leg drive off the wall to be obtained. Anything more than a gentle turn should wait until you are quite confident about your rehabilitation.

Similar considerations apply to diving. If a relative beginner wants to go back to the way they started to learn, a gentle roll and stretch from a squat position on the poolside can do no harm. This can be progressed up to a pike fall from a standing position, where you simply topple forwards while keeping your eyes fixed on the intended point of entry, and your arms pointed towards it. The standard advice on reaching the bottom: “Touch, tuck up, and push off to the surface” will require the tuck to be taken up gently, at least until you can be confident of the condition of the *rectus abdominis*. Dives which involve taking up tuck or piked positions in the air require the same degree of conditioning as recommended for butterfly.

If you wish to impress your friends with your diving skill, take up a straight and stretched position on the three metre board, with your hands extended above your head, and the hands correctly clasped, and simply fall in, keeping perfectly straight. You will execute a perfect dive entry, and you can do it as a back dive as well as a forward dive. It works for children, too. Just don't try it from any height other than three metres: it won't work!

Exercise in water can be excellent, but if you are looking for a class, not all aqua aerobics teachers are equal. There are several different routes to an aqua aerobics qualification, and they don't all cover the same syllabus in the same detail. I would suggest watching a class, and then if you consider that you would like it, have a word with the teacher. If you explain your circumstances, the teacher should be able to advise you on any exercises you should omit, or take gently. I taught and examined Aquafit teachers for twenty years, but I never got round to adding post-ostomy work!

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