

Craftsbury

SCULLING CENTER

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2007 Sculler's Handbook

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2.1 Definition of Technique

Technique can be defined as *the method of performing the stroke*. It is how you move the boat. Developing your ability to execute the cyclical rowing stroke in the most efficient manner increases your likelihood of achieving personal satisfaction and good competitive results while reducing the risk of back or rib injuries. The more mastery you have the less energy required to realize a specific goal. Good technique is directly related to high economy.

2.2 The Steps of Learning Technique

Proper handling of the sculls with minimal power application. Developing basic maneuvering of the boat.
Mastery of the sculling motion in a wide beam boat or team boat. Emphasis on learning the drive and use of body weight.
Transitioning to balancing a racing single with medium power application.
Command over a racing single with technique maintained under various weather and water conditions.

Ref: *Skillful Rowing, McNeely/Royle, p.89*

2.3 Three Key Principles

Good Posture: Good posture reduces the probability of losing any force through movable soft parts of the body and prevents injury at the same time. Good posture means a strong and solid body positioning but not stiff. The famous coach and inventor of modern rowing technique, Steve Fairbairn, called it "freely erect" posture-horizontal chain and keeping the head and shoulders moving on one level during the whole stroke are main indications when the rower does it correctly. If this horizontal movement of the head and shoulders is achieved, the center of gravity of the rower moves minimally in the vertical direction, conserving energy, and maintaining the run of the boat.

Rowers with good posture put themselves in a position to transform all their forces onto the handle, maintain a large force over the whole stroke, and produce a high peak force. Although good posture is necessary during the whole stroke, it is most important at the entry and at the release. In these positions, the rowers can gain the necessary length of the stroke arc and stabilize their bodies to avert injuries.

The length of the stroke depends on several factors: the size of the athlete, the fitness of the athlete, the boat class, the length of the oar etc. The larger and stronger the athlete, the faster the boat, and the shorter the oar, the longer the stroke must be! However, the athlete must always maintain good posture.

Correct Use of Hands: The hands are the direct connection of the rower to the oar. They have the function not only to transform all forces but also to guide the oar and thus the blade. At the entry, the hands must be loose and quick to get the blades in the water in the shortest time. In the next split-second the force of the legs is transferred to the blade through the hands on the oar handle. During the release, the hands have to direct the blade quickly out of the water and execute the feathering. Therefore, the oar must be placed in the fingers (not the fist). During the recovery the fingers are relaxed and loose around the handle, ready to perform the quick entry with a little flick of the wrists. Then they hold onto the oar with flat wrists until the thumb completes the feathering movement.

Correct use of hands also includes continuous movement of the hands, the handle, and the whole body. Pauses (like in the release) or particularly fast movements like rushing the hands out of the release) are to be avoided. World-class athletes always look 'smooth' while rowing even when the boat is going fastest. Smooth movements are an indication that the speed of the motion does not change abruptly.

Bladework: The best propulsion is produced when the blade is completely surrounded with water. Obviously, the blade should have no contact with the water during the recovery. At the entry, the blade is guided into the water with the least amount of splash. Any splash is inefficient energy expenditure. Especially, a back splash actually slows the boat down. This means that the speed of the entry must increase with the speed of the boat. For example, the blade can be placed in the water at any speed for the first stroke of the start (boat velocity=0), but the rower has only a few hundredths of a second to do the same movement when the boat is in full speed. The main direction of force on the blade should be horizontal. Therefore any vertical movement of the blade must be avoided. Only at the end of the stroke does the blade have to be directed out of the water. To do so, it is best to create a pocket behind the blade by moving the blade gradually out of the water while still applying force. This pocket allows the blade to be finally detracted from the water without "entering" water on the back of the blade.

Ref: *Biomechanics of Rowing: Coach Boat View, Volker Nolte; Rowing Canada Aviron Winter 2002*

2.4 Technique vs. Style

Throughout technical discussions it is important to make a clear distinction between technique and style. Technique training is based on a model of the ideal rowing stroke and this frame of reference forms the rudiments of teaching the skills involved. Coaches and athletes collectively must have an understanding of a model that maximizes both biomechanical and physiological needs. A technical model must also be flexible as developments in equipment or new scientific findings may influence current thought and practice. A model is malleable.

The elements of technique refer to learning the parts of the stroke. Correct practice of the stroke as a whole in combination with drills is how those elements are learned. The manner in which an individual performs the stroke can be termed one's style. Style incorporates distinct ways of executing the *fundamentals of an accepted model of the rowing stroke*. It may include traits of the athlete or coach's character and personality or be a specific way of performing a movement that is defined by the rower's anatomical or physiological nature.

Because you have your own individual requirements to meet the technical challenges posed by the rowing stroke, use caution when attempting to directly imitate the technique of champion rowers or scullers. A champion's style does not always represent a perfect model of the stroke. Their style is the result of how they have solved their own technical issues. Study their technique as an example of how he or she has developed their own highly proficient, personal style that successfully executes the elements of the rowing

stroke. Use your observations to influence your own individual needs.

Ref: Skillful Rowing, McNeely/Royle, p.89

2.5 Factors Affecting Technique

Physical preparation, how fit or strong you are, has a major influence on your technique. In order to execute the stroke correctly one needs to have adequate leg strength, core body strength and cardio-vascular conditioning. Poor physical conditioning will limit your ability to acquire new skills and decreases your chances to maintain proper technique under the stress of fatigue. Technical deterioration is often the result of a decline in physical fitness. For example, without core trunk stability and lower back strength it becomes very difficult for one to maintain posture through the drive often causing the body weight to collapse at the finish of the drive. In another case, without leg power a sculler cannot properly initiate the acceleration of the body weight that is an essential component of the stroke.

Lack of flexibility can also be a limiting factor in achieving good technique. The compressed lower body pose of the catch requires both hamstring and low back flexibility to meet the demands of the position. Either leg compression or upper body posture is compromised when flexibility is lacking. Poor hamstring elasticity will affect your ability to set your body preparation after the release while keeping your legs extended. Flexibility can be improved with practice and it is to every sculler's benefit to incorporate some stretching into daily training sessions. Improper rigging is another factor than could affect your technique adversely.

Ref: Skillful Rowing, McNeely/Royle, p.91

2.6 Tips on Correcting Faults

- Identify the faults to be corrected; isolate the components of the stroke to be remedied.
- Prioritize the primary fault to be corrected.
- Give immediate attention to correction of the fault; an athlete needs to understand the implications of the fault.
- Work on one fault at a time.
- Once the fault is eliminated, the replacement element needs to be demonstrated and learned. The athlete needs a model to learn from.
- Practice the fault correction early in the practice, right after the warm-up so fatigue doesn't interfere with the learning process and concentration is better.
- Avoid working on fault correction late in a practice session when fatigue is present.

Ref: Skillful Rowing, McNeely/Royle, p.134

2.7 Getting back into the boat from the water

With few exceptions, most single scullers fall out of their boats during the course of their rowing careers. Collisions, breakage, catching crabs, or losing an oar can all be reasons. If you are just learning to row a single, tipping out of the shell can be a common event. Knowing how to get back into your boat from the water is important. First, if you tend to scull alone and do not have shores you can swim with your boat into the skill of climbing back in can be an important safety skill. Second, knowing you can handle yourself in the event that you do fall in builds confidence that will help you become more comfortable in your boat so you can relax and learn technique better. Third, if you row in cold water, being able to handle yourself and the boat

quickly can prove critical in a dangerous situation.

Here are suggested steps to get back into your boat from the water:

1. Hold onto the boat once you are in the water. Never leave your boat and try to swim. The boat and oars will float you. Come up near the rigger.
2. Stay relaxed; breathe.
3. Make sure that the boat is righted with the seat up. If you rolled the boat so it is upside down, press down on the rigger nearest you to begin to roll the boat, then reach across and pull the other rigger down towards you so the boat will be right.
4. The oar closest to you should be all the way into the oarlock and the blade flat on the water so it can support you. Hold this handle down in the boat with your hand nearest the foot stretchers.
5. Next, you need to get the other oar handle so you can hold both handles in the bottom of the boat. You may need to jump up or reach to get the other handle but you must get both handles together in one hand before you can continue.
6. Push your seat towards the bow.
7. Hold both handles in your hand closest to the foot stretchers, and with your other hand reach across to the gunnel. You will need to keep pressing on the handles.
8. Kick and jump into the boat as if you are getting out of a swimming pool onto the deck of the pool. You need to be focused on getting the weight of your hips over the boat and into the seat deck. Avoid trying to pull yourself into the boat.
9. Once your hips are in the boat, you are stomach-down, kick again, turn and sit, letting your legs dangle over the side of the boat still. Don't let go of your oar handles here.
10. Raise your oar handles up to right the boat.
11. Make sure both blades are flat on the water and you are stable.
12. Swing your legs in the boat.
13. Put one foot back and scoot back on the seat.
14. Put your feet back in the shoes.
15. Practice it again!

If you row a wing rigger boat or a boat without back stays this method will work well. If you have trouble getting your hips into the boat you may need to do some upper body strengthening. For boats with back stays, some scullers carry a terry cloth wrist band on their oars and can use it to hold the handles together in the event that they need to straddle the boat and get back into the seat deck from the bow. Whichever method you choose feel that you know what to do in case you go in the water. If you do not want to practice in your own boat use a training single or a more stable boat to learn how to get back in.

2.8 Maneuvering

Rowing circles with one blade: Start from the finish position, blades flat on the water, boat balanced. Row with one oar only, leaving the other oar feathered on the water for stability. The stabilizing oar handle should be held against the body. Follow the blade with your eyes to see the effect of your actions through the water. Try placing the blade in the water, letting the handle go free to see the natural depth of the blade, and then placing your hand back on the handle to "follow" the movement of the oar. Row yourself in a full circle with one oar and then switch and row around in the other direction with the other oar. Use the least possible power and a loose grasp.

Stopping: Learn how to stop rapidly. From a moving position, at the release, square the blades and press them into the water for a "braking" effect. Lean your body against the handles if needed.

Backing: Backing is when you move the boat towards the stern. First begin by practicing gliding up and down the slide keeping the blades slightly tilted on the surface of the water. Then practice backing with one hand only, the other rests near your body. Start from the finish position, square one blade in the water, letting the blade float; push your hands away from your body. At the end of the stroke, turn the blade feathered with the concave surface facing the water so the tip of the blade skims the water as you bring your hand back to your body. Try 10 strokes and then switch to the other hand. Then use both together. When you are comfortable with the backing motion you may add in slide length as you push away to make the stroke longer. Work up to backing for 50 strokes.

River Turns: Once you are able to back the boat down, you are ready to learn a river turn. You move your hands together but alternate the position of the blades. Using arms/body only, push your hands away from you with the port blade squared and the starboard blade feathered on the water; port backs, starboard is feathered on the water. Then take a stroke with the starboard blade as the port blade is feathered and skims the water; starboard rows, port is feathered. When you have mastered this you can lengthen your slide to take longer strokes. This is a quicker, more efficient way to turn the boat than simply rowing yourself around with one oar, especially if the water is fast or there is strong wind.

Steering:

- Look for important landmarks to line up your stern for various sections of a course in order to point the bow in the correct direction.
- Make steering corrections when the blades are in the water. Scullers can change their course by altering the extension of the handles at the catch. Slightly lengthening the arc of one oar handle will allow the boat to turn to the opposite direction at the initiation of the drive. This will keep disturbance of the drive phase to a minimum.
- Check your course by glancing over your shoulder during the drive if you are in a sculling boat. Some scullers also prefer using

a mirror mounted on a hat or headband. Practice the alternation of looking over right and left shoulders for 10-20 strokes during steady rows to get comfortable with this. In a race situation, look out of the boat only as much as you need to for safety, steering, and passing other boats. Excessive steering will decrease your boat speed.

2.9 Selected Drills

Two-finger Sculling: The purpose of this drill is to learn to relax the hands allowing them to feel the natural path of the oar handles as dictated by the buoyancy of the blade in the water. Avoiding heavy gripping on the oar handle will allow the blade to seek it's own level in the water and provide perfect blade depth. This is a classic drill for learning a loose and relaxed hand placement on the oar handle. The ease of letting the blades sit at the correct depth in the water is obvious and pleasant. Relaxation of the hands cannot be stressed enough to develop sensitive sculling skills.

- Row easy.
- During the recovery normal hand placement is used.
- Once the blade is in the water at the catch, lift the middle, ring, and little fingers off the oar handle and draw through to the release using only the index finger and the thumb on the handle.
- Let the blades float in the water. There should be no tension in the hands, arms, or upper body during this drill. Relax and note how easy it is to keep the oars at the correct depth in the water.
- Perform continuously for 10-15 minutes when you include drills in your daily work out.

Pick Drill (Part-stroke sculling):

One of the most common drills used by scullers as a regular part of the warm-up. The pick drill sequentially builds the stroke up to a full slide stroke. It is important that each position has a technical focus. Row 40 strokes at each stage. As part of a race warm-up 15 acceleration strokes can be included at the end of 40 strokes.

- Stage 1: Arms/hands only. Keep handle height high enough to keep the blades buried. No body swing. Tall posture.
- Stage 2: Arms/back only. Pivot forward from the hip: timing of transfer of weight onto the foot stretcher.
- Stage 3: ¼ slide. Move just breaking the knees; timing the transition from the release to incorporating the slide.
- Stage 4: ½ slide. Increase the distance the seat moves to half slide; maintain correct handle height and posture.
- Stage 5: ¾ slide. Prepare for the change of direction at the catch; head and body posture kept steady.

- Stage 6: Full slide. Complete the lower body compression; opening of the arms out for the catch. Full strokes.

Pause Drill (Single-stroke sculling):

A pause of approximately 2 seconds interrupts the ordinary cycle of the stroke giving the opportunity to stop briefly and balance the boat with the blades off the water. It is also very useful for checking the position of the body at a designated point on the recovery. Pauses can be incorporated at arms/body away, $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ slide. Arms/body away is an excellent way to focus on the acceleration phase of the stroke with a fluid release and complete body preparation. When the pause is broken the recovery can be continued by compressing the lower body and allowing the arms to open with the arc of the oar handles.

Begin by pausing once every stroke for 20 strokes, then once every other stroke for 20 strokes, etc...up to 5 strokes continuous rowing 1 stroke pause. Relax. Balance the boat with the blades off the water. Take your time and let the hull slow down. An advanced sculler can pause with the blades square. Double pause drills incorporate 2 pauses during 1 recovery.

Feet-out Rowing: The purpose of this drill is to practice correct release timing of the blade from the water while keeping the body weight consistently behind the oar handles. Feet-Out rowing teaches to preserve the inertia of the drive in order to initiate an effortless flow into the recovery. While performing this drill, keep firm pressure through the thumbs on the end of the handles and feel the pressure of the water on the face of the blade. This lateral pressure into the oarlocks will assist you with a clean exit. Focus on achieving a sense of lightness at the release by learning correct timing. Pay close attention to "freely erect" posture. This cannot be over-emphasized. Spend 10-15' rowing feet-out 2-3x per week until you integrate the tempo.

- Remove feet from the boat shoes and place feet on top of the shoes.
- Enforce good upright posture throughout the stroke, paying special attention to sitting up tall over the seat at the release. Allow your body's core strength to support the finish turn with head up and shoulders still.
- Row continuously with firm pressure keeping the feet out. Maintain pressure with the collar into the oarlock.
- Time and coordinate the release precisely with the completion of the leg drive in order to keep the body weight behind the handles and transition smoothly into the recovery.
- Incorrect execution of the change in oar handle direction and follow through will allow the body weight to fall too far to the bow and the feet will come off the shoes.

Catch Drills: Correct placement of the catch is a difficult part of the rowing stroke. It requires precise timing, quickness, and relaxation combined. Catch drills teach you to place the blade in the water effectively without disturbing the boat. The catch is the last motion of the recovery; the blade entry must occur before the drive begins.

Begin from the finish position, the backstops, clear the blades from the water. Come forward on the recovery-bringing the boat under you- and place the blades in the water as you compress at full slide. Do not initiate the leg drive. Take the blades out of the water and return to the finish position. Repeat 10-15 times with precision and blending the recovery and catch into one fluid motion.

2.10 Rigging

Getting Started:

Rigging is the art and science of adjusting a boat and oars to meet your individual needs. The hardware of a boat such as: riggers, pins, oarlocks, foot stretchers, seat, and tracks can be set to optimize your biomechanical position in the boat in conjunction with your chosen oar dimensions and blade type. The make of your boat will dictate the amount of adjustability available to you. Generally, performance singles have the widest range of possibilities to customize your rig.

Before you begin you will need to get organized:

- Keep a logbook of all your rigging activities. Record the date and current measurements so you can retrace your steps if you need to.
- Have the correct tools ready: Hex keys, wrenches, a pitch meter, a long carpenter's level, and a tape measure with centimeters.
- Put your boat up on slings in a quiet place away from the distractions and curiosity of other scullers willing to give you lots of advice.
- Take your time and write everything down.
- Complete one step at a time.
- Once you measure, measure again.
- If you get tired, take a break. Keep your sense of humor.

Setting Up Your Boat:

Before you start to take measurements or change the dimensions of your rigging you need to set your boat up in a way that will make it easy for you to work on it. Since a *third hand* is not always easy to come by here is a suggested way.

- Set your boat on slings of about the same size. To stabilize your boat, take a rod or stick (like a broomstick) and place it vertical next to one of the riggers. Using a large spring clamp- clamp the rigger to the stick to prevent the boat from tipping.
- Level the boat end-to-end. Place the carpenter's level along a level part of the boat such as the base of the gunnel; do not use the seat deck because there is a slight angle from bow to stern. If needed, fold and prop a towel between the boat and sling to level the boat.

- Level the boat side-to-side. Place the carpenter's level across the gunnels. When the bubble is centered, adjust the clamped rigger with the vertical stick to hold the boat level.
- Strap or tie your boat to the slings to further stabilize it.
- Bring your toolbox near by. Now you are ready to start.

When you rig your single you are setting the dimensions of the riggers and oars to maximize your biomechanical efficiency and comfort in the boat. As we know, rigging is not an exact science as there is a fair amount of art and "touch" mixed in. There are some basic rules and references that need to be adhered to and serve as a platform to fine-tune your boat for you. Your rigging needs can also change over time. As certain elements of your technique improve, rigging details can be adapted to support those improvements.

Keep in mind that you are working multi-dimensionally when you rig your boat. You are balancing horizontal, vertical, angled, and diagonal measurements to create a leverage system that allows you to move the boat effectively. When you make one change to your rigging it affects the entire system and small alterations, at times, can produce large effects. Once you alter your rig you need to row with it several times to get accustomed to a new feel to decide whether the change was positive or not. Using a speed device such as a Speedcoach™ that can measure meters per second, distance, and 500-meter split times, is useful for objectively observing whether a rigging change makes you go faster or not. Having a stretch of flat water without current is valuable for testing rigging changes over 500-meter or 1000-meter repeats.

Before we start measuring, the following descriptions of the terms "through the pin" and "load" will give you an overview of important aspects of rigging.

Through the Pin:

The pin is the vertical axle the oarlock rotates around that extends upward from the end of the rigger. In rigging, the pin serves as a reference point for positioning yourself in the boat. The terms "through the pin" and "work through" refer to where the centerline of the hip joint and the seat is relative to the location of the pin. The hip joint axis may be behind, equal to, or astern of the pin at the catch position. Drawing an imaginary line from pin to pin provides a standard for the hip joint axis to reach in full compression when ready for the catch. In a performance single it is desirable to be at zero, or equal, with the pin. In a faster moving boat you may work 1-2 cm through the pin. Your flexibility, skill level, and boat type can all affect your ability to get up through the pin, but the point here is to identify the pin as a reference. Being centered in the boat and around the "work" helps to produce the optimum angle of the oar at the catch and the release. This prevents the boat from being "pinched" which is when the blade is in an ineffective, extreme position that actually pushes water laterally against the hull disrupting forward propulsion.

Load:

Load is the term that defines the resultant energy relationship of the distance between the pins, inboard/outboard settings of the oars, blade size, and a sculler's physical dimensions. On a rowing ergometer, the concept of load is illustrated by setting the damper resistance high at "10" or low at "1" and is expressed as drag factor. Unfortunately, in the boat, there is no clear-cut way for the average person to define drag factor and measure the load of their rigging system. There does exist, however, reasonable parameters to follow as we continue our discussion of rigging.

Keep in mind that more is not necessarily better when it comes to load. It can be *too heavy* producing undo stress on the lumbar spine, creating excessively large arcs in the water, and making it a strain to increase your stroke rate adequately during a race. On the contrary, *too light* is a bit like trying to pedal a bike down a hill while spinning your large chain ring; you need to take too many strokes to maintain the desired speed. Your individual body dimensions, strength, and race pace stroke rating, play a role in how much load you can optimally row with. Boat builder, Ted Van Dusen, of Concord, MA, advised to, "Rig for the end of your race," meaning set a load that is adequate to maintain efficient race tempo yet light enough that you can increase the stroke rate for the final sprint when you are in a fatigued state.

Step 1: Setting the Spread

The spread is the distance between the two oarlock pins. This is a major measurement of your gearing system that will combine with your oar settings to determine the load of your rig. Measure from the center of the top of the pin to the center of the top of the other pin. To make it easier, you may have another person to hold one end of the tape measure for you. Record the number of centimeters.

The range for setting the spread is usually between 158-cm. to 164-cm. An average starting point is 160-cm. If you are a smaller sculler a spread of 158-cm may be appropriate and if you are a larger sculler, 162-cm. may be more comfortable.

Moving the spread in creates a heavier load and larger arc through the water. Moving the spread out lightens the load, creating a smaller arc in the water. You need to feel that you are comfortable to open your hands along a horizontal plane well over the gunnels as the blade is prepared for the catch. This happens in conjunction with other factors but setting the spread is the initial consideration.

It is of the utmost importance to make sure that the pins are set an equal distance from the centerline of the boat. Measure across the gunnels of the boat, take half the number of centimeters, and then measure from that point to the pin. For example, if gunnel to gunnel is 46 centimeters, half of 46 is 23, locate the 23-cm. mark on your tape measure, place it on the gunnel nearest the pin you are measuring, and measure the remaining distance to the pin. It should read 57 centimeters if your overall spread is 160 centimeters. (1/2 of 160 cm.=80 cm.) Another method to check if the pins are equidistant is to measure from the outside of the opposite track to the base of the pin and check that both sides are the same. You can use this method because the seat tracks should be set centered in the boat. Once you

have finished setting the spread. Measure it again. Do not change your spread casually once you have it set, you can use other adjustments to make smaller gearing changes.

Step 2: Determining Inboard

Setting the inboard on your oars is another rigging step that relates to overall load. The inboard is the measurement that is defined as the distance from the end of the handle to the blade-side face of the collar. The inboard setting is dependent on the overall spread and the amount of overlap of the oar handles or crossover. Take $\frac{1}{2}$ your spread and add 8 centimeters for a good initial setting of your inboard. Thus, if your spread was 160-cm., your inboard setting would be 88 cm. The inboard measurement serves as a way to fine-tune your load as you may move the collar in small increments to affect the load. Moving the collar towards the handle creates a shorter inboard lever and makes the load heavier. Conversely, moving the collar towards the blade, makes the inboard lever longer and lighter. Measurements between 87 to 89 centimeters allow a great deal of adjustment. If you need a setting such as 86 centimeters, you also may need to select a shorter overall length of the oar to avoid an excessively heavy load.

Step 3: Oar Length

The third factor in determining load is the overall length of your oars. Your size, strength, and blade design will affect what length oar you choose to scull with. A shorter oar lightens the load; a longer oar increases the load due to the longer outboard. Outboard is the measurement from the blade-side face of the collar to the tip of the blade. A standard overall length for a Macon blade is 298 centimeters; hatchet-shaped blades- 288 centimeters. A larger heavyweight man may increase these measurements by 1-2 centimeters and a lightweight woman sculler may decrease these measurements by 1-2 centimeters.

Some experimentation is needed in your sculling to set the overall length. Your needs may change as your personal style of sculling develops and you race at higher rates or gain strength. You also may find that you prefer a lighter load if you tend to be quicker and more reactive versus someone who prefers a heavier, power stroke. Remember that spread, inboard, oar length, and personal attributes must all work together. There is no sense to row with excessively heavy loads to impress others. If anything lean towards lighter loads to protect overstraining the lumbar spine.

Step 4: Oarlock Height

When you sit in a boat, the first thing that you usually notice is where the handle height is. If you row club boats, you know that some boats feel "high" and others "low". This can be due both to the size of the boat relative to your weight and to the height set at the oarlock. If you row a hull that is too big for you, you do not sink the boat to the proper water line and you will generally feel too "high" in the boat; as if the oar handles come up to your chest. Rowing with the correct height is a one reason to row the right hull size for your weight. Accurate oarlock height allows you to clear your blade from the water on the recovery and lets you to apply your body weight properly during the drive.

Due to the crossover, in sculling there is a slight height differential between the starboard and port oarlocks of 1- 2 centimeters allowing the sculler to row left over right. This difference in the height setting gives room for the hands to nest together at the crossover and keep the boat level. The differential setting can be a personal setting, as some scullers may like a little more and some a little less. The important point is that the boat stays on keel at the point of crossover.

Standard oarlock height runs between 13 to 18 centimeters and is largely a comfort or stylistic setting. At the finish, sitting with good posture, and blades buried, your thumbs on the handles should just brush your middle ribs at the level of your sternum. You do not want to feel that your handles are in your lap or up near your neck.

To measure height, use a long level placed across the gunnels. Set one end through the center of the oarlock and hang the other end over the seat. Use a tape measure to establish the distance from the bottom edge of the long level, to the bottom of the oarlock, and the top of the seat. Every time you measure height make sure to put your level in the same place and measure to the same point on the seat and oarlock to keep the references consistent.

Sliding the oarlock off the pin and changing the number of washers above and below the pin can usually suffice to change height in most boats. Note: When you purchase a boat ask the builder if the height differential is set in the rigger construction or needs to be set at the oarlock; if you row in a boat with a wing rigger check whether the starboard side of the wing is shimmed higher than the port. Some European clubs row right over left, in which case you need to reverse the standard height differential to raise the port side.

Step 5: Sternward Pitch

Sternward pitch is the angle of the blade away from perpendicular during the pull through of the stroke. A small amount of pitch, 4 to 6 degrees, is enough to help the blade stay buried at the proper depth through the water. If a blade has too much pitch, more than 7 degrees, the blade will wash out at the finish; too little pitch, less than 4 degrees, causes the blade to dive deep. Sternward pitch is a fore-and-aft measurement usually taken at the oarlock but it must be kept in mind that it is the angle of the blade that we are concerned with, so knowing the pitch of the pins and the oars has to be taken into final consideration. The pitch of the blade = the pitch of the pin + the pitch of the oarlock + the pitch built into the blade.

Measuring the pitch will begin with checking the pin. Ideally, if the pin is set at 0 degrees it makes it easy to calculate your oarlock pitch. Unless you check it you don't know what the reference is. A commercially available pitch meter or a simple level can be used. With your boat set up level in slings, slide the oarlock off taking care to count the washers setting the height. Place a vertical level against the sternward face of the pin and see if it zeros out. If it does the pin is at 0 degrees, if not, you may be able to shim your pin to get it to 0 degrees, otherwise use your pitch meter to determine how many degrees you are +/- 0.

Adjust your pitch meter on a level portion of the gunnel. Put the pointer on 0 and then center the bubble on the level. Tighten the level so it is firmly in place. Place the squared surface of the pitch meter against the face of the pin and move the pointer until the level's bubble is centered. Record the number of degrees the pointer reads in that pin.

Next, put the round pitch inserts into your oarlock with the number of degrees you want and check that the top and bottom shims are in the right orientation (read your oarlock owner's manual). Slide the oarlock back on the pin. For example: If your pin is at 0 degrees and you want +5 degrees put in the +5-degree shim. However, if your pin is +1 degree you need a +4-degree shim to give your oarlock +5.

Once you have put the oarlock back on the pin and secured the top bolt, measure the pitch in the oarlock. Hold the oarlock at the mid-drive position (with the gate closed and nut pointing towards the stern) parallel to the midline of the boat. Zero your pitch meter and then place the squared surface of the pitch meter against the back plate of the oarlock. A spring clamp can be handy for this. Make sure the surfaces are flush to get an accurate reading. Your measurement should agree with the sum of the degrees in the pin + the inserts. If not, try again until you get the desired degrees. 5 degrees is the most common setting, 6 may give you a little more bite at the catch and 4 a little less lift to the boat at the catch. Whatever amount of pitch you choose, make sure that both sides are the same.

Step 6: Outward Pitch

Outward or lateral pitch is the tilt of the pin away from the centerline of the hull. The standard 0 to +2 degrees assists the tracking of the blade in the water. You can measure it by placing your pitch meter on the lateral aspect of the pin and measuring. You can also see the effect of lateral pitch in the oarlock. With the pitch meter in place against the back plate of the oarlock, check your reading of degrees at mid-drive, swing the oarlock to the catch position and you should see the sternward pitch increase. Then swing the oarlock to the finish and you should see the degrees diminish to assist the release of the blade. Your readings should look like: catch +6 degrees, mid-drive +5, and finish +4. If you have the inverse relationship, your pins could have negative lateral pitch and require creative shimming to rectify.

Step 7: Pitch in Oars

In North America, the majority of oars are built with 0 degrees of pitch, meaning that the position of the blade is level with the wear plate surface on the sleeve. If you row with unknown or wooden oars you may have to measure your oars at the blade to determine if there is pitch built into the blades and take those degrees into consideration when setting the pitch at the oarlock. You can do this by setting your oar on a bench with a level block as wide as the blade supporting the blade and another support block under the handle. Place the blade face down on the block with 1" of the tip off the edge of the block if you are measuring a Macon blade or with the short side corner radius of the blade just off the edge of the block for hatchet-shaped blades. The put your level across the wear plate surface to see whether it is at 0 degrees. Shimming to get the level zeroed, Concept 2® recommends that .025" equals

approximately 1 degree of pitch. If it is necessary to measure your oars check with your manufacturer for specific instructions because there are variations depending on blade type.

Step 8: Foot Stretcher Adjustment

The foot stretcher adjustment should be placed so that you are both able to get up through the pin at the catch and have about the width of a fist between the handles at the release comfortably in front of your body. You need to avoid feeling crowded by your oar handles at the release forcing unnecessary lay back and yet not have excessive room to allow the handles to swing past the plane of the body, thus losing the weight off the handles.

Step 9: Heel Height

Heel height is another measurement that can facilitate easier compression into the catch. The standard range is 16 to 18 centimeters from the top of the seat to the bottom of the heels. Many boats have adjustable footboards making this easy to change. If your boat has clogs, you may be able to re-drill and lower the heel cups to get a better setting.

Step 10: Rake of the Footboard

The angle of the footboard can be measured with a protractor or a goniometer (like those used in physical therapy clinics). Standard measurements should fall between 39 to 42 degrees. If you have poor ankle flexibility, it may be necessary to flatten the footboard to get into a more comfortable position at the catch. If you have good flexibility, 40 to 42 degrees is a desired setting to assist the leg drive in using the entire surface of the foot. Many performance boats have this adjustable feature, otherwise you will have to reposition the footboard and its attachments.

Step 11: Setting the Tracks

Once you have set your rigging dimensions and foot stretchers, you need to set the seat track so you do not touch either end and have freedom of seat movement. Most tracks are quite long giving lots of room for adjustability. Reaching inside the hull and loosening the small wing nuts that hold the track usually allow you to move the tracks. Do not take the wing nuts off; just loosen enough to slide the tracks fore-and-aft. Set the front stops to the stern of the pin far enough to allow you to get up through the pin in full compression but not so far as to hit the back of your calves in an uncomfortable way.

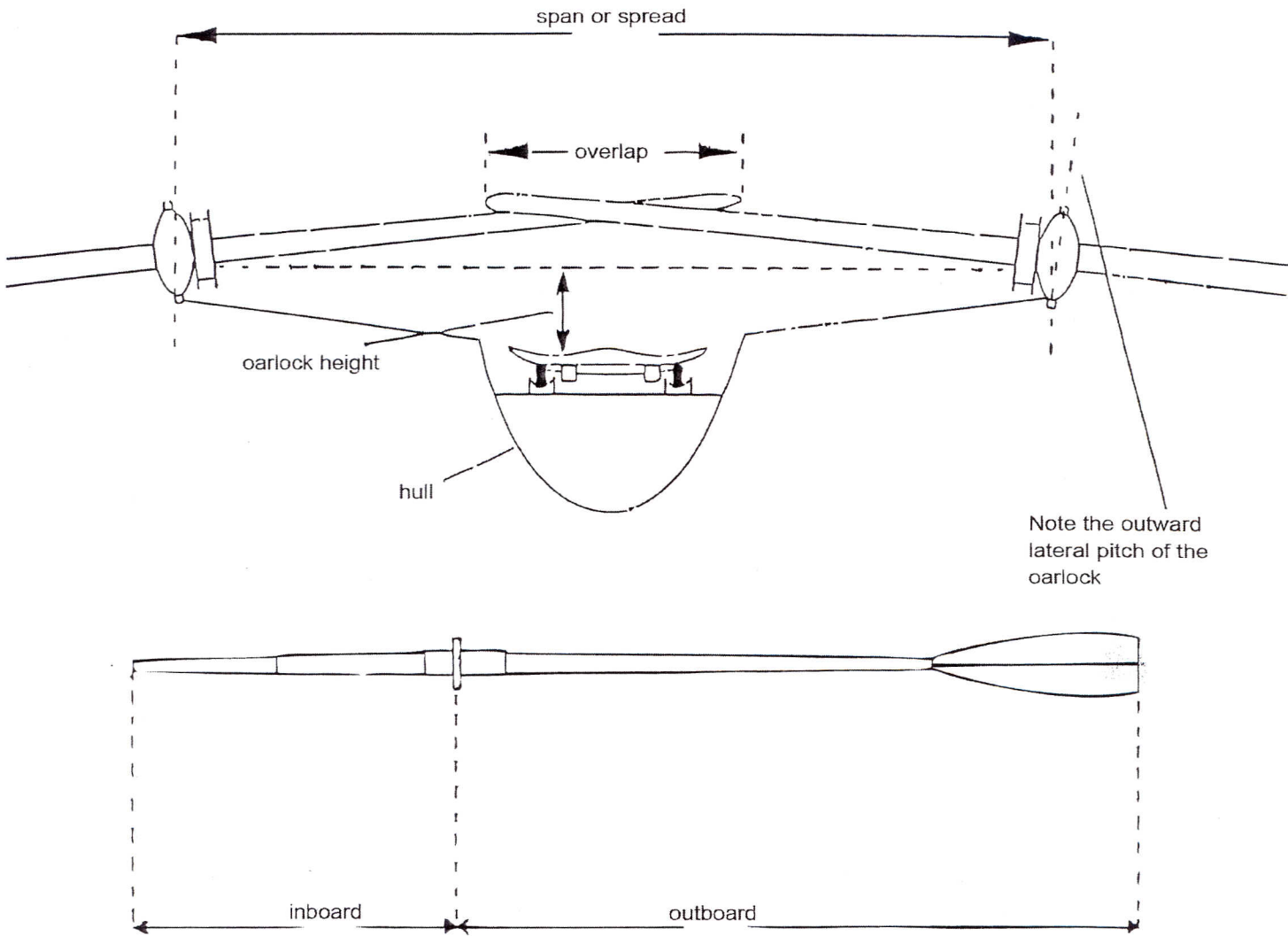
If your boat does not have adjustable tracks you must do your best to get the best possible position within the dimensions available to you.

Step 12: Wing Rigger Adjustments

Boats with wing riggers offer some additional adjustability with regards to getting through the pin, setting height differential, and overall oarlock height if the amount available on the pin is not enough. Some care needs to be taken to position the wing in a way that maintains the trim of the boat and does not shift weight too far to either to the stern or bow. Your boat builder is the best person to discuss the rigging of the wing of a particular type of hull.

Ref: Craftsbury Website: Tech Tips, Spring 2002

Rigging Figure 1: The basic boat measurements



Note the outward lateral pitch of the oarlock

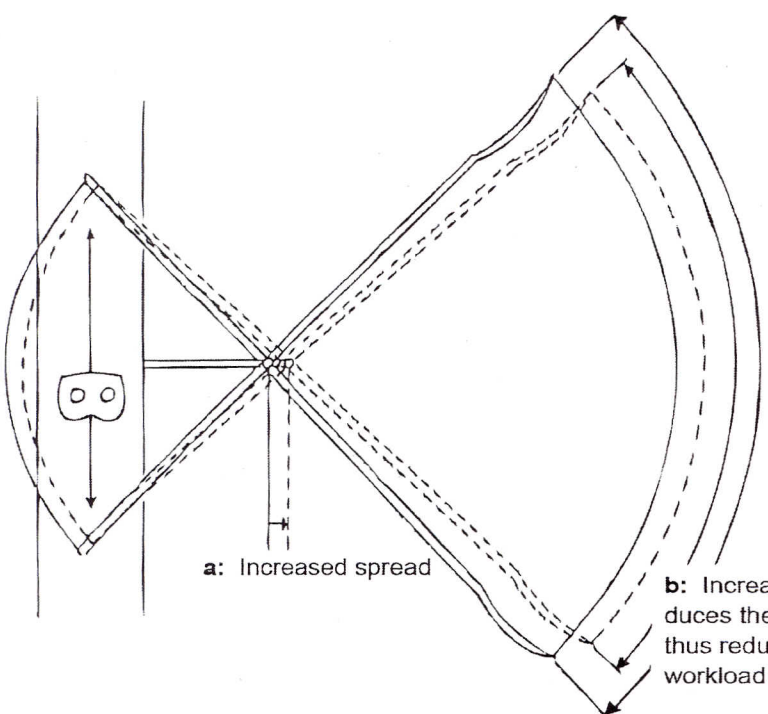


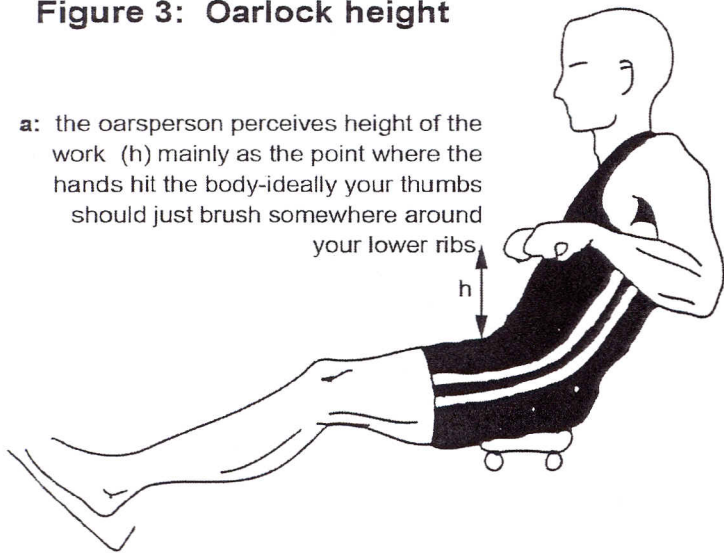
Figure 2: The effect of changing the spread of the rigger on the arc of the stroke.

a: Increased spread

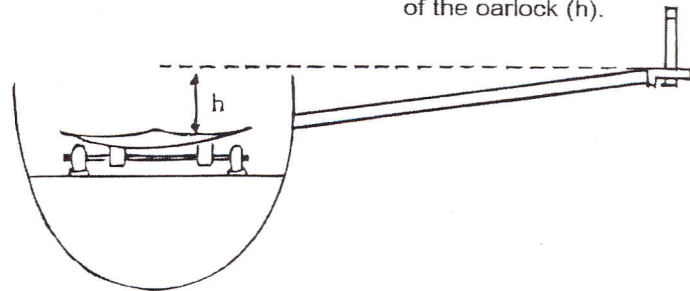
b: Increased spread reduces the arc of the stroke, thus reducing the athlete's workload

Figure 3: Oarlock height

a: the oarsperson perceives height of the work (h) mainly as the point where the hands hit the body-ideally your thumbs should just brush somewhere around your lower ribs



b: to quantify oarlock height, the distance from the front top edge of the seat to the bottom of the oarlock (h).



c: height is generally adjusted by exchanging washers above and below the body of the oarlock.

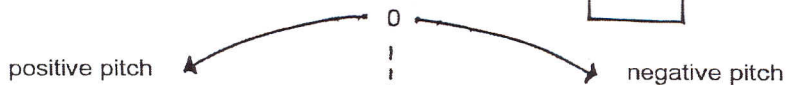
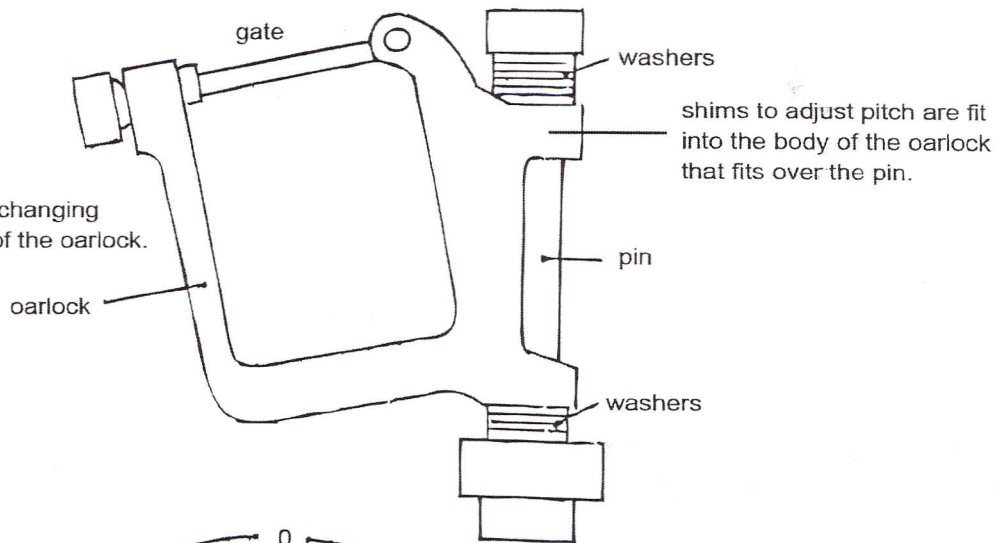
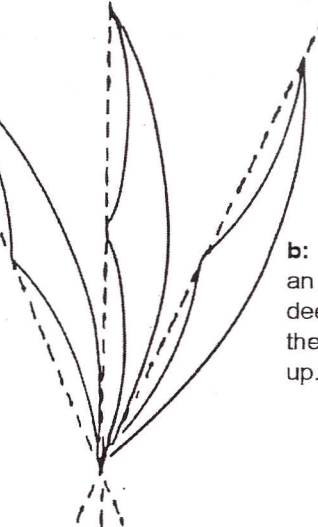


Figure 4: Blade pitch

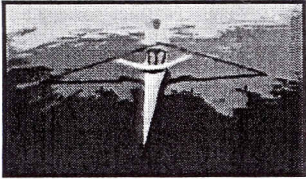
To be clear, we're speaking here of the pitch of the blade resulting from adjustments made at the oarlock as described above.

a: **Positive Pitch** - too much positive pitch or an overpitched rig makes it difficult to keep the blade at the correct depth in the water during its stroke. Often there's a tendency to washout at the finish and it is difficult to place the lade in the water at the catch.

b: **Negative Pitch** - too much negative pitch or an underpitched rig causes the blade to dive deep at the catch and be difficult to extract at the finish. The tendency to catch a crab goes up.



Craftsbury Sculling Center



Chapter 3: Information and References

3.1 Rowing Organizations and Information Sources

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3.3 Rowing Boats and Equipment

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3.5 Article: The Art of Sculling

3.6 Article: Flexibility Facts

3.7 Exercises: Daily Fifteen Stretching Routine

3.8 Exercises: Core Strength

3.9 Article: Lightning and Thunder Safety

3.10 Certificate of Continuing Education for USRowing Coaching Program

3.1 Rowing Organizations and Information Sources

Organization	Website	Notes
FISA	www.fisa.org or www.worldrowing.com	International Governing Body
US Rowing Association	www.usrowing.org	National Organization
Masters Rowing Association	www.mastersrowing.org	National Organization
Rowing News	www.rowingnews.com	Premier Rowing Publication
Row2k	www.row2k.com	Rowing Web Site
IROW	www.irow.com	Rowing Web Site
Rachel Quarrel	www.total.rowing.org.uk	Rowing Web Site from UK
Rower's Almanac	www.rowersalmanac.com	Reference book

3.2 Rowing Services and Merchandise

Roylew Performance Training Programs	www.roylew.com	Training Consultation with Marlene Royle roylew@aol.com
JL Clothing Design	www.jlracing.com	Clothing
Regatta Sport	www.regattasport.com	Merchandise
Mariner Insurance Group	www.mariner-group.com	Boat insurance
Row Works	www.rowworks.com	Clothing & Slings
Sew Sporty	www.sewsporty.com	Clothing
Leonard Insurance Group	www.ligonline.com	Boat Insurance
Potomac Rowing Catalog	www.potomacrowing.com	Books & Merchandise
Boathouse	www.boathouse.com	Clothing
Sparhawk Model Oars	Sparhawkmodeloars.com	Oars & Plaques

3.3 Rowing Boats and Equipment

Concept2	www.concept2.com	Racing Oars/Ergometers
Croker Oars	www.crokerusa.com	Racing Oars
Nielsen-Kellerman	www.nkhome.com	Speed Coach & Electronics
Peinert Boatworks	www.sculling.com	Boats
Van Dusen Racing Boats	www.vandusenracingboats.com	Boats
Filippi Racing Boats	www.eliterowing.com	Boats
Maas Rowing Shells	www.maasboats.com	Boats
Hudson Boatworks	www.hudsonboatworks.com	Boats
Kaschper Racing	www.kaschper.com	Boats

Shells		
Levator Boatworks	www.levator.com	Boats
Alden Rowing Shells	www.rowalden.com	Books & Boats
Resolute Racing Shells	www.resoluteracing.com	Boats
Durham Boat Company	www.durhamboat.com	Boats & Oars
Dirigo	www.dirigousa.com	Boats
Pocock Racing Shells	www.pocock.com	Boats
American Sculling Inc.	www.AmericanSculling.com	Boats
Vespoli USA	www.vespoli.com	Boats
Empacher	www.empacher.com www.empachercanada.com	Boats & Oars
Fluidesign	www.rowfluidesign.com	Boats
Sharrow Racing Shells		Flyweight & Lwt. Boats Port St. Lucie, FL

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3.5 Article -

THE ART OF SCULLING

by James O. Joy

This paper was presented December 8, 1978 at the NAAO Weekend in Syracuse.

Introduction

As we all know, a little learning is a dangerous thing. But a great deal of highly specialized learning is also a dangerous thing and may be sometimes even more dangerous than a little learning. One of the major problems of higher education now is how to reconcile the claims of much learning, which is essentially specialized learning, with the claims of little learning, which is the wider but shallower approach to the human's problems in general.

From Aldous Huxley's *"Intergrate Education"*

Huxley voices his concern over the trend towards specialization in education, his anxiety over "much learning" seems to be shared by **Richard Burnell** as it relates to the training of the sculler. In his book, *The Complete Sculler*, Burnell writes that it is not enough for the sculler to be "...just strong, or skillful; fit or well-prepared." The sculler's learning must encompass all aspects of the sport.

The sculler is a skilled athlete, an artist, reaching constantly for more sublime levels of skill and performance. His or her sculling is an art form -- beautiful, graceful, powerful, rhythmic and speedy. In the following pages a detailed explanation is offered by which this form can be developed. This is the art of sculling.

A General Concept of the Sculling Stroke

For fifty years, until his death in 1971, **Robert Fitzpatrick** of Canada taught an effective sculling stroke. Fitz thought that it was important for each student-sculler to develop a clear image of the mechanics of sculling "in the mind's eye", in outlining Fitz's general concept, three aspects of the stroke cycle are sketched before moving into the area of specific movements:

- i) The Overall Body Motion
- ii) The Body Motion in Relation to the Shell
- iii) The Bladework

i) **Body Motion**

The body, with the exception of a slight pause of the back and legs at the finish, of the drive phase, is constantly in motion. Various writers have referred to this, as "the continuous cycle". Each phase of this cycle is intimately connected to the next, resulting in a very fluid, effortless motion. For the body to move in this manner, symmetry, muscular control, balance, accuracy and good posture are essential. The last characteristic cited may be the most important-- posture. Bill **Bowerman**, University of Oregon Track Coach, writes that "Good posture is essential for good body mechanics." The sculler approaching this art as an interminable learning process aligns his body to refine the movements and to utilize his energy effectively. Unnecessary "erratic" and "harsh" movements are eliminated.

ii) **The Body Motion in Relation to the Shell**

Richard Burnell writes, "Rhythm is sculling in

harmony with the movement of the shell." The sculler learns to feel and monitor the individual physical movements and the body coordinated with the shell and sculls. This feeling comes through the hands, shoulder-arms, feet and buttocks. With time and practice the sculler begins to blend with his immediate environment -- shell, sculls and water. This "complete" athlete, sculler, is synchronized with the run of the shell, applying constant pressure on the drive, and returning with a relaxed effortless recovery. The sculler learns to move his bodyweight effectively throughout all the phases of the stroke.

In the early stages of practice and development the athlete must slow the movements of the skill in order to maximize the effect of the body striding. This is true for skating, swimming and sculling. With practice and experience these perfected, rhythmic movements become ingrained and unconscious. **Ernie Arlett** supports the importance of good controlled body movement when he writes "What happens in the boat provides efficient bladework and a controlled recovery that capitalizes on the bladework."

iii) **Bladework**

The importance of the hand grip is usually recognized as the main factor in acquiring good bladework -- accuracy, timing, control. The sculls are held in a relaxed fashion between the fingers and the pads of the hands. This hand positioning allows for maximum "play" between the hands and the oar handles without sacrificing control. However, it is equally important to relate the action of the blades to the total body movement. The tendency may be to consider the bladework as an isolated facet of the stroke cycle rather than a natural extension of the overall body motion. If the body movements are effortless, the bladework is probably characterized by an easy flow from feathering to squaring -- flexible. The blades are set into the water and removed neatly, accurately and quickly. The blades, like the body motion are continually in motion. There is a definite "blending effect" in the relationship between the sculler, his shell and the sculls. The key to maintaining this delicate relationship is found in the "even pressures" on the blades in the water. Eugen Herrigel, in *Zen In the Art of Archery* provides a parallel image. He writes: "We master archers say: with the upper end of the bow the archer pierces the sky, on the lower end, as though attached by a thread, hangs the earth, If the shot is loosed with a jerk there is a danger of the thread snapping. For purposeful and violent people the rift becomes final, and they are left in the awful center between Heaven and earth,

The power at a constant pressure on the blades is the "thin thread" between sculler, shell and water.

Specific Technical Considerations

"It requires less effort to get fit than to acquire technique...Just as it is necessary to get fit each season, so it is necessary to overhaul and improve technique."

Richard Burnell's words echo the feelings of the master dancer, the ultimate athlete and the old professional sculler. Each season, they concentrate upon evaluating, revising and refining various movements comprising the form.

THE STROKE CYCLE ENTRY

The combination of good, fluid posture and accurate bladework produces an effective beginning. It is understood that the timing between the inboard and outboard is precise; the extended body, seat and blade arrive at "full reach" simultaneously,

The ingredients of "good posture" include general body symmetry, extended arms, level wrists and hands, and erect carriage. The upper body is fully extended from the hips,

The hands and feet feel the pressure on the blades, allowing the bodyweight to be used effectively during the drive phase. The blades move quickly, without check, from the recovery into the drive phase; the squaring action and anchoring at blade depth are accomplished quickly and fluidly. In order to initiate this effective entry, the balance achieved during the recovery must be maintained through the brief entry phase.

DRIVE

The beginning of the drive in a sculling boat is theoretically a relatively simple affair; the arms, back and legs move simultaneously. Thus, the action of the body is synergistic with a strong fluid arm pull ably supported by the action of the leg and shoulder, muscles. The resulting effect is that the back and legs will finish together, shortly before the final action of the arms. The wrists remain level or flat throughout this phase of the stroke. The modern longer slide bed tends to make the movement of the upper body less pronounced in comparison to the earlier orthodox body swing. A strong, steady leg drive gives the stroke length and allows the bodyweight to be employed effectively. The legs commence the drive splayed, ideally with the knees under the armpits. This symmetrical position helps to maintain balance and gives the "internal" body room. The muscle action of the legs is sequential, radiating from the balls of the feet upwards through the calves and thighs. The hands and shoulders remain relatively level. The blade pressure is constant as the blades "grip" or "cup" the water -- eliminate slippage. However, the sculler must be conscious that the arm pull during the later stages of the drive is maintaining pace with the speed of the shell.

The tendency is to rush this phase of the stroke and hurry into the recovery... If you wish to control your recovery speed, make your drive more effective by maximizing the power application through the arms, legs and back. This is the thermostat for the stroke cycle.

RELEASE

This is the key to the continuous motion or cyclic nature of the stroke. The release, or rounded motion, is the follow through of the drive. In order to have an effective release, the upper body and legs combine to form a strong, balanced base of support for the controlled, coordinated arm and hand action. Specifically, the arm action utilizes the ball and socket joint of the shoulder and the hinge joint of the elbow to rotate and extend the arms in a smooth effortless turn. As you refine this motion try to minimize the use of the wrists by allowing the oar handles to "play" in your hands. It is important to keep the wrists level as long as possible,

The movement of the arms, hands, wrists and upper body are performed sequentially in an unhurried fashion. Fairbairn referred to this aspect of the stroke as being elastic. The total body moves from a state of high tension to a state of relaxed control on the recovery,

RECOVERY

The bodyweight is balanced and evenly distributed over the seat. Bob Fitzpatrick, with a twinkle in his eye, would suggest to sit lightly to allow the breeze to blow between the buttocks and seat.

An erect posture originating from the hips allows the body angle to change fluidly throughout the recovery. In the early stages of a sculler's development this is a conscious action but with practice becomes part of the subconscious. The arms and hands move upwards slightly during the final stage of recovery and this counters any pitching of the upper body. The intricate timing of the body, seat and blades is contingent upon this controlled, fluid, body swing. The "swing" is effortless, allowing the body to rest while the shell is "running" unchecked between strokes. The arms during this phase are relaxed at the release end and slightly tensed at the entry end. This recovery of the body and arms is the keystone in the arch.

THE SWING AND FLOW OF THINGS

There are similarities between the sculling stroke and the golf swing. Their motions are timely, controlled and effortless. In the summer of 1976 I was fortunate to witness Ben Crenshaw play a round of golf in the Pleasant Valley Classic. Each swing by Crenshaw was a marvelous, awesome display of controlled power. At the time my mind conjectured the speed of the sculler who could harness center and utilize his strength as effectively. Most sportsmen appreciate intrinsically the beauty of a co-ordinated swing whether it be from a baseball bat, a golf club, or a pair of skulls.

If an observer wishes to probe more deeply into the intricate structure of the stroke cycle, he or she can discover subtleties and messages that mirror life. The alternating demands of each stroke parallel the vicissitudes of life: the cycle is a symbolic microcosm.

The sculler is poised and ready before entering the stress of the drive phase. The body position is balanced and strong. The arms tighten slightly. All the energy reserves of mind, body and spirit are mustered. This energy is not dissipated suddenly with a brief display of force, rather, it is dispersed in an orderly and sustained fashion. There follows an easy and fluid transition from the stress and tension of the pulling into the recovery phase; the unhurried movements of the drive sets the stage for a controlled recovery. Our poise and control under stress gives us a certain bearing in quieter moments. There is an obvious flow and integration in the sculling motion. We have seen this characteristic in people outside the confines of a crew shell; with a moments reflection each one of us can recall an acquaintance who has this quality.

Talented athletes such as Bobby Orr, Gordie Howe, Bob Pearce, Carl Yastremski, have displayed this quality -- the presence of mind and body.

Interestingly enough, the distinct phases tend to complement one another. The timing of the entry improves with an improvement in the timing of the release; the control of the recovery is indirectly related to the controlled dispensing of power during the drive. Herein lies the paradox of the cycle. Where you expect a relaxed state, some tension occurs and is needed; the opposite occurs where there is a need to relax under stress in order to move

effectively. It is these very paradoxes that add so much color, balance, vitality and beauty to sport, sculling and life itself. I am reminded of Frankl finding meaning in life and the horrors of Auschwitz and Coningsby Dawson's Living Bayonets, which provides an account of the severely wounded soldier smiling, as he is carried from the battlefield in France of 1918.

It is easy to reduce these four phases, entry, drive, release and recovery to simple efficient physical movements. But we can choose to elevate the skill to more sublime levels that heighten our psycho-physical awareness and consciousness. In the process we are transformed to more sensitive human beings. The body movement in the shell is something more than the index of our training and experience, it can indicate the level of sculling and the sculling mentality.

THE SCULLING MENTALITY- "The eager mind in the lithe body."

The purpose of the complete sculler is to refine the movements, so that they are fluid and controlled. Obviously, this process has a pronounced impact upon both mind and body: an effortless physical motion is achieved so too is an increase in awareness, confidence and sensitivity along with an effortless physical motion. In regard to the development of mental sensitivity, I recall a situation that involved Bob Fitzpatrick and one of his pupils. During a particular practice Bob reached for the megaphone to make a comment to the sculler. He observed Bob's movement and almost immediately made the necessary technical adjustment without a syllable having been uttered. According to the Impeccable Fitzpatrick, this amazing development occurred on two more occasions during the course of the practice -- a beautiful example of intelligent sculling and coaching. Thus, the sculler "plays" at a conscious level to refine movements that overlay a whole strata of subconscious rudimentary motions. The sculler strives to achieve higher levels of performance much in the manner of the artist. Nureyev writes, "I cannot sit. I must dance, I must reach for those newer and newer and still newer levels of exultation," Fitzpatrick recognizes the key to those more sublime states of performance lay in technical improvement.

This suggests very emphatically that an Ivanov at 28 years was significantly improved as a sculler over the Ivanov of 18 years. And every serious sculler ought to recognize that this art involves prolonged and intensive study. Jim Barker of Philadelphia Undine tells his students: "Learning to scull is similar to a four year college education." Each season brings not only invaluable new racing experience but also new technical challenges as there are 'many levels to sculling' With this in mind, the sculler is well-advised to approach this art with humility, appreciation and attachment. The latter quality suggests his ability to concentrate and center his total mental and physical energy upon the learning process. The important presuppositions are that the sculler realizes how much there is to learn, that he or she desires to learn, and has a deep appreciation of the skill involved.

In this intensive study the mind and muscle (proprioception) are trained to be sensitive to the individual movements and the movement of the body in the shell. This awareness or sensitivity is largely centered in the hands as they monitor the neat, accurate entry of the blade and fluid even pressure throughout the drive. Other specific locations in the body,

namely the shoulders and legs, will also feel the effect of efficient, productive bladework. At the more advanced levels of sculling a very high degree of monitoring and bio-feedback is occurring. The coach merely reaffirms the skill of the performing artist. He is the rather odd combination of parent, video and choreographer.

Both principals, tutor and student employ the utmost degree of patience and self-control so that this transformation can proceed smoothly. Again, all the participants seem to be developing a certain "presence of mind." Eugen Herrigel wrote: "Wait patiently and see what comes -- and how it comes."

The learning process cannot be hurried. Fitzpatrick felt that you were working with nature; human nature in the broadest sense--mind, body, spirit. With the full development over the years of each of these aspects of "fitness", the basic bodily movements are easier to perform, appear unhurried and relaxed. With this type of approach the learning process is enjoyable and there is a high degree of self-realization on the part of the student and teacher that progress has been made. However, "time does run out each season", as the competitive phase creeps in and the artistic skills become secondary to the art of racing. In the face of this new demand it is worthwhile to step back and weigh the words of Shivas Irons, the protagonist in *Golf in the Kingdom*. "I see the distorted swings, the hurried rounds, note the electric carts tae (that) ruin the courses and rob us of our exercise, And the configuration o' physique that shows me how twisted lives twist our bodies," Despite the demands of competition, attention must be given to the means, the technical development. Shivas is really telling us to be attentive to the pace of the shell, the race and life. Many a coach has exhorted his crew and scullers to row their own race, Karpinnen seemed to display this ability at Montreal.

It is implicit that as much skill and fitness competence as possible must be developed before a person is scheduled to race. The young sculler can be easily demoralized if he or she is raced without the benefits of adequate training. This competence and confidence are developed by miles upon miles of good "sweet" sculling until the move-become more automatic and the mind is attuned to the totality of the situation. The early practice sessions each spring are primarily concerned with improving the kinetics and as the racing season approaches, the psycho-physiological aspects become even more important. There is a definite symbiotic relationship between these two aspects of the skill development that is between the kinetics and psycho-physiological, that can either hinder or advance the transformation. However, in each aspect the sculler is seeking to discover his limits.

Viktor E. Frankl, a Professor of Neurology and Psychiatry, a survivor of Auschwitz writes, "Man is curious to locate the limits of his possibilities, but by approaching them, he pushes them ever farther like the horizon. From this it follows that in any competition in sports man is really competing with himself." This is refreshing, especially when the general tone of academia is simply to reduce sports to the role of pacifying tension, Frankl can see the value of tension, of stress, and of challenges.

However, on the other side of the picture we cannot overlook the importance of the element of play in this development. This is not a rigid process either in the systematic

approach of the tutor or in the application of the technique by the sculler. Both people ought to explore and experiment. The mind as well as the body ought to be "open" and flexible. A healthy and profound mind-body development occurs as the sculler begins to sense the skills, the rhythm, the grace and power of physical motion performed flawlessly.

CONCLUSION

Ultimately, optimal boat speed is achieved and maintained by a rather indirect approach. The tutor and student systematically develop and refine the various aspects of the technique. The basic principle is that as the individual's movements improve, the overall stroke cycle improves accordingly, Huxley would approve heartily of this approach that is both humanistic and not the least bit specialized,

Franz Stampfl expressed his dismay at over-specialization, and asked, "What's wrong with knowing all about all track and field events?" The rowing coach, following Stampfl's lead ought to study all events including sculling. Some are; notably Bill **Sanford** of Syracuse. The learning and teaching then, are as Kenneth. Doherty calls it, holistic and one's education, experience and practice are integrated. When Waldemar Clerptnski, the 1976 Olympic Marathon champion was asked about his coaches, he cited Jorg Ramlow who gave him an interest in the arts, discussions of literature, going to the theater and listening to classical music.

The coach and student ought to consider all aspects of modern scientific training. They should have an understanding of basic rigging, biomechanics, anatomy and physiology. Usually the interest and the awareness, in our technological age, is present. This is not a problem: What may be lacking and what one sports historian has termed as historical or "cultural" amnesia, is the scullers lack of a historical sense. As Bruhn and Nureyev learn from a thorough study of the artistry of Nijinsky, so can Drea, Karppinen, Kolbe and Dietz learn from Pearce, Hoover and Burk. It is interesting that Rosenberg in his reference to the TenEycks and Ariett in his reference to Bossy Phelps, support this theory. We can learn from the scullers of the past and build on their experiences. The sculler ought to have a keen sense of sculling history and tradition: the coach can certainly play a leadership role in this area. There are similarities as well as new developments when one contrasts sculling technique between present and past; why was Hanlan so effective against much larger men? Besides this historical and educational perspective, the sculler can achieve a poetic sense of his own role in this tradition. It is this perspective that helps to provide some insight into both the ecology of our natures and one's external environment. We are simply back in touch with our physical world.

It is, or can be a great education to become an accomplished sculler. This is the credo of sculling coaches like Robert Fitzpatrick; it is a great art and a magnificent love affair. George Leonard simply punctuates this feeling when he states "You are a lucky man if you can find a strong, beautiful discipline, one that takes you beyond yourself,"

- An inscription Tait McKenzie used on the 1928-32 Olympic Shield -- his *Shield of Athletes*.

May/June -- 1973
Richard Burnell, *The Complete Sculler*
Susan Dorcas Butt, *The Psychology of Sport*
Frank Cosentino, *Ned Henlan*
Kenneth Doherty, *Modern Track and Field* Viktor E. Frankl, *The Unheard Cry For Meaning* Aldous Huxley, *The Human Situation*
Eugen Herrigel, *Zen in the Art of Archery*
Dr. Peter Klavara, *The Art of Christine's Sculling*, From *The Oarsman*, July/August, 1977
Nicholas Kaye, *Sieve Fairbairn on Rowing*
Michael Murphy, *Golf in the Kingdom*
Allen Rosenberg, *The Rosenberg Style*, from *The Oarsman*, May, 1972
Walter Terry, *Nureyev at Forty*, Saturday Review, 11/11/78
Fred Wilt, *Specialization in Track and Field Coaching*, Track Technique, 1978

Recommended Reading:

Ernest Ariett, *The Happy Medium*, from *The Oarsman*,

3.6 Article-

Flexibility Facts

Learning how the body moves and the roles played by different components will help you better understand your body's needs and exercise more effectively and safely.

How Flexibility benefits you:

- Promotes body awareness
- Increases relaxation, both physically and mentally
- Optimizes learning and performance of athletic skills
- Reduces risk of injury in joints and muscles
- Helps maintain strength
- Enhances freedom of movement
- Assists in postural correction
- Reduces soreness and tension with consistent practice

Common Contraindications to Stretching:

- Stretching in a position where a bone blocks motion
- Stretching where there's a recent fracture
- An acute inflammation or infection in or around the joint
- Osteoporosis
- Sharp, acute pain with joint movement or muscle elongation
- History of recent sprain or strain in the area
- Vascular or skin diseases that may be irritated by stretching

Limitations to Flexibility:

- Postural problems
- Tight muscles, tendons and ligaments
- Restrictions in the joint capsules
- Previous injury
- Muscle soreness
- Genetics
- Age
- Gender
- Level of activity

However, with a combination of training and attention to stretching, your inherent potential for increased flexibility and health can be better realized.

Successful Flexibility Training includes:

- Position of the body to support the stretch
- Orientation and placement of the involved parts during stretching
- Motions involved in the stretch
- Intensity and duration of the stretch
- Regularity of stretching

Why Static instead of Ballistic stretching?

Static stretching is recommended as an effective stretching technique for increasing flexibility with minimal risk of injury. A static stretch involves holding a position that gradually stretches the muscle and connective tissues to a greater length; the bouncing in ballistic stretches may actually tighten the muscle.

STATIC stretching protects against the neuro-muscular response called the stretch reflex, a reflex action that causes the muscle to contract against the stretch. A sensory receptor inside the muscle alongside the muscle fiber called the muscle spindle monitors the length and tension of the muscle: it responds to a stretch on that muscle by sending a signal to the spinal cord, then receiving a message back from the spinal cord to contract. The faster and more forceful the stretching movement, the harder reflex contraction will be. In other words, the initial tightness you feel with a stretch is actually the muscles contracting! BALLISTIC stretching imposes high-force, high-speed movements on the muscle, stimulating the stretch reflex: This will not only defeat the stretch you are working toward, but can generate a tremendous degree of tension on the muscle fibers and increase the possibility of injury. When a stretch is performed slowly and gently, the stretch reflex is minimal and the greatest relaxation response can occur for the muscles you are stretching.

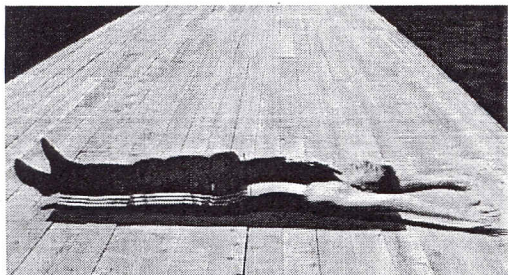
When is the best time to stretch?

Most experts now recommend stretching BEFORE AND AFTER exercise activity. Warm-ups with general low-intensity activities like walking help increase blood flow and enhance range of motion. Cool-down stretches after exercise activities will provide maximum gains in range of movement and overall increase in flexibility. This is especially important after aerobic exercise because after typical aerobic activities (including rowing) muscles are actually tighter. Whenever performed, each stretch should begin gently and progress gradually to a more advanced stretch.

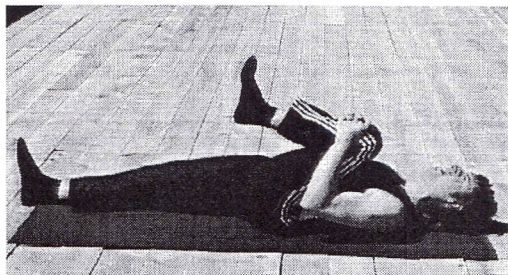
3.7 Daily Fifteen Rowing Stretches

All stretches below should be held for a minimum of 10 seconds with 30 seconds being your goal. One should assume that while only one knee, arm etc. may be shown below that you should switch sides and be certain to include the other side as well. As always:

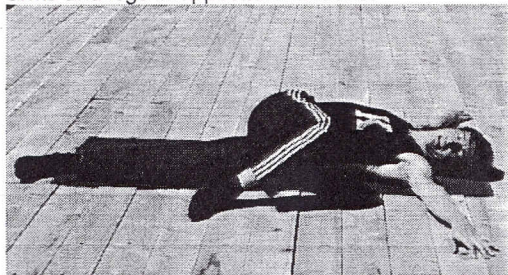
- Stretching should be preceded by some warm up
- Be especially mindful of posture and position to avoid injury
- **DO NOT BOUNCE, RUSH OR FORCE THE POSE.** Move smoothly into position, then pause at the point of tension, not pushing to discomfort
- Breathe naturally, but exhale as you relax into the stretch



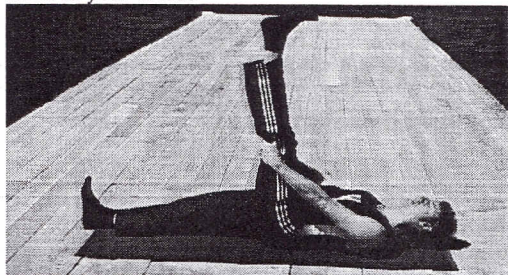
1. The Rack – Lying on your back, stretch your arms and legs in opposite directions.



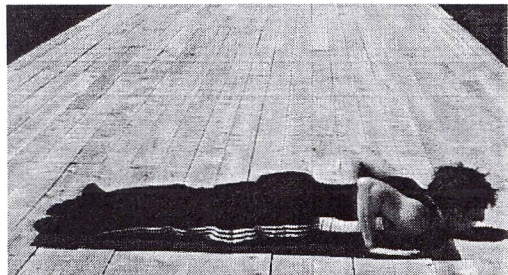
2. Knee to Chest – Lying on your back, hug one knee to your chest.



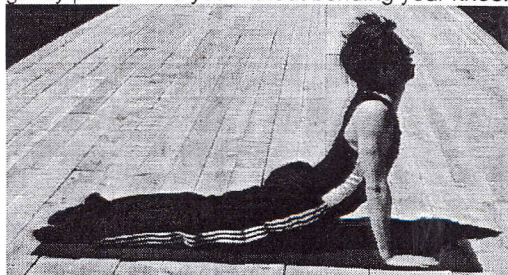
3. Knee Across – Lying on your back, bring your knee across your body to the floor.



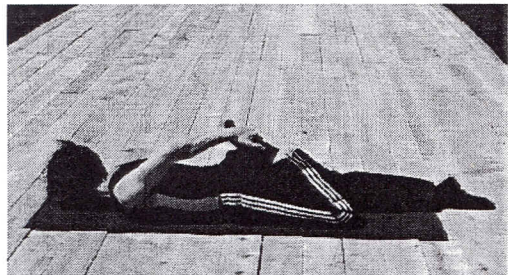
4. Leg up Hamstring – Lying on your back, extend one leg directly up to the ceiling and gently pull toward you without bending your knee.



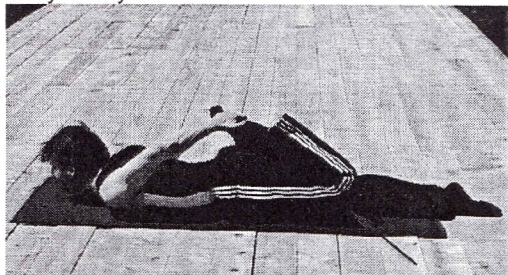
5. Cobra – Start lying on your stomach, palms by your side at sternum level.



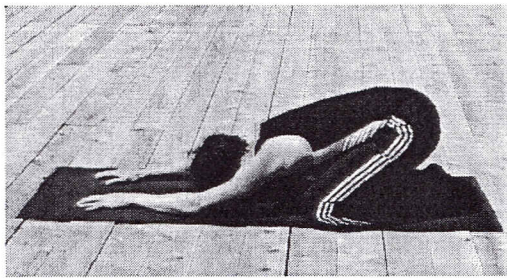
Gently raise your upper body off the floor but keep your thighs on the ground. Toes are pointed away from you.



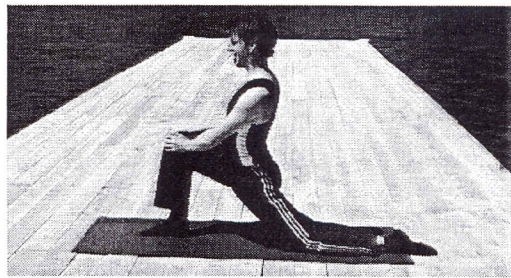
6. Lying Quadriceps – Lying on your stomach, reach back and grab your heel. Pull your heel toward your butt.



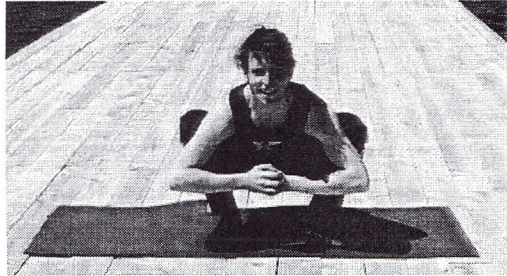
7. Lying Hip Flexor – Add to stretch #6 by raising your knee off the floor.



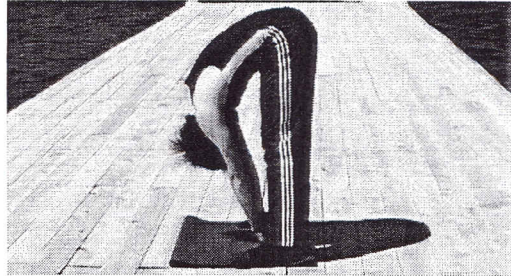
8. Child's Pose – Sit back on your shins, splay your knees and reach your arms above your head.



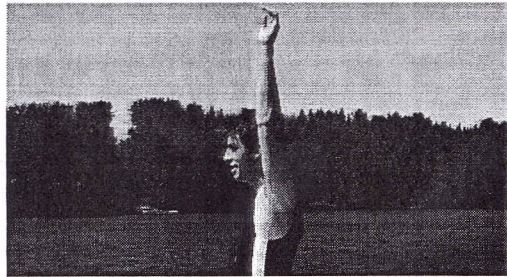
9. Kneeling Hip Flexor – Kneeling on one knee, step your foot out in front of you and lean forward.



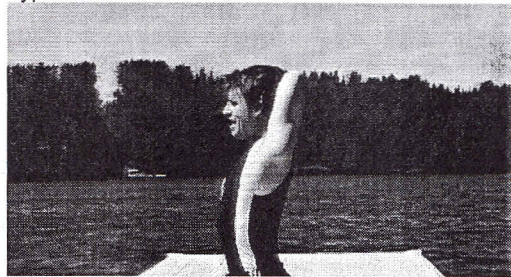
10. Squatting Achilles – Stand with your feet wider than shoulder width and squat very low keeping all of your foot on the floor.



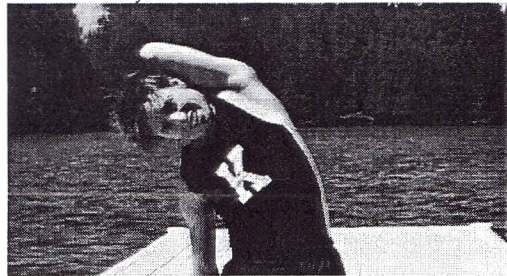
11. Standing Hamstring – Stand with feet shoulder width apart and reach for the floor with your knees straight – but NOT locked or hyperextended.



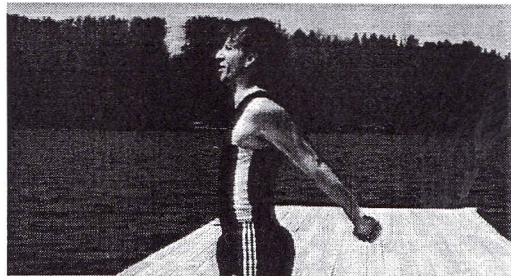
12. Standing Triceps – Standing, reach your hand above your head.



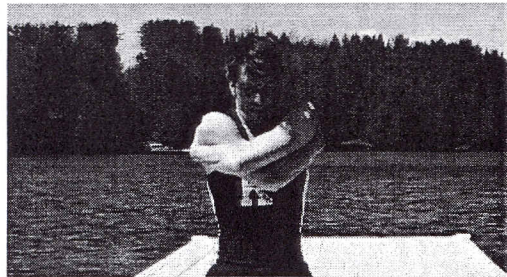
Try to touch the center of your back.



13. Triceps and Obliques – Add to stretch number 12 by leaning away from your stretching arm.



14. Biceps – Interlock your fingers behind your back and raise your arms as high as possible while keeping a straight back.



15. Hug Traps – Give yourself a hug and tuck your chin to your chest.

3.8 Core Strength and exercises

What is core strength?

If you ask "What is core strength?" you'll probably get lots of different answers. The most common mistake people make is to think about core strength only as strong abdominal muscles.

The core includes all the muscles at the middle of our body: abdominal, lower back, gluteals, obliques, and many smaller, lower layers located in the middle of the body. When you think of core strength, you have to imagine the foundation of the building. This is the part that connects our upper and lower body, holds our posture, maintains balance and is involved in most of our body movements.

It is important to understand, that it is all about balance. One may have good-looking abdominal muscles, but if the rest of the core area is weak this is a recipe for disaster. For many years people were led to think that if they do their sit-ups every morning, their backs and their body will be well supported.

Remember, to build a good core, you need to work your upper, middle and lower back as well as the front and both sides of the torso. As you see it will take more than just sit-ups to build the core.

Strength is one of these qualities that doesn't take too long to build; Comparing to stamina and speed for instance. The saying "easy come-easy go" applies very well to strength. It won't take very long to build good core. You will see, and most important feel, the results after a short period of time. But after you build it, you have to maintain it, or you will lose it fast.

Every time young people grow an inch or two, they lose some of the strength that they already have built. If their core strength isn't strong enough to support and keep the body connected, simple daily activities, such as lifting things or sitting at the computer for a long time, can do permanent damage on their spine. This danger is much greater if they are involved in high volume training. If athletes and coaches pay more attention to their upper body and core strength, this will insure a long and healthy active sport life, without negative spine changes and back injuries.

Many adults choose sculling and cross-country skiing as their main aerobic sports because it is a great joy to be outside, they are full body sports, and very important, both sports have very low impact on the joints. If you are going to use your upper and lower body at the same time, you need good connection in the middle. Remember that every sport demands a good core, but not every sport will necessarily build it.

With that in mind, you will be more likely to enjoy many activities or sports you choose without injuries. If you build and maintain good core strength. It doesn't matter if you are an athlete, just an active person or you just want to protect your back while working around your house or garden, having good core strength will give your body good support.

There are many different core strength programs out there. Choose the one that fits you best. Good core means good posture, better balance, good body support and less back injuries.

Important Notes:

- Before you start your core strength routine do some aerobic activities, like walking, easy jogging, spinning or some active exercise for up to 15 minutes to raise your heart rate and warm up your muscles.
- After any exercise be sure to stretch while the muscles are still warm.
- Be sure to drink plenty of water while exercising.

How to start Building Core Strength

The first thing you need to do before you start a core strength routine or any new training program is to evaluate your level at the moment.

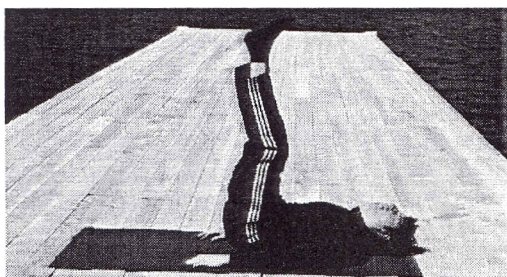
The first 10 exercises at the beginner's level are for building a good balanced core. Start by going over all the exercises. Some of them will feel easier than others. **Do not push too hard.** Do as many as feels comfortable. Remember or record the highest number you have completed. For the next 3-4 weeks, your goal will be to do the same repetitions of each exercise with the same strain.

When you are building strength, you have to listen to your body. The day after you have done your routine, you'll feel some tension in the muscles you have worked. If you don't feel anything, do it again. However, if the muscles are sensitive take a day or two off, but no more than that and do it again.

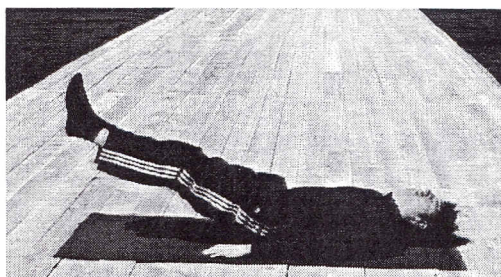
When you get to the point that you can do the same repetitions for all the exercises and they feel equally hard, stay with it for a couple of weeks before you start increasing the number, about 15-20 repetitions of each exercise is a good goal. You just need a 20-30 minute routine, two to three times a week and you will be able to maintain your strength that you've worked hard to develop.

If you are involved in any sport or fitness program, or you are following some upper and lower body strength program, you should move to the advanced core strength exercise routine.

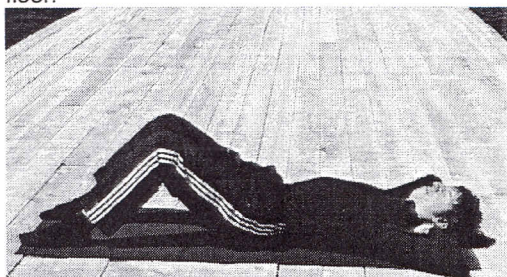
Core Strength for Beginners



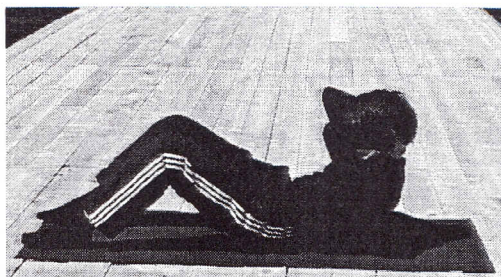
1. Beginning Position (BP) – on your back, hands beside the body, legs at 90 degrees to floor.



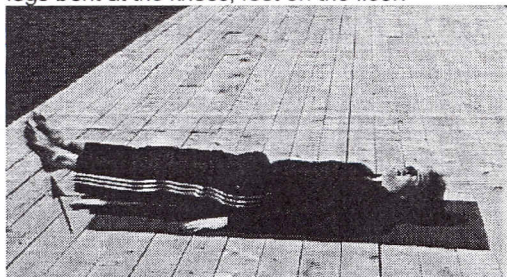
Lower your legs to 45 degrees. Hold several seconds, return to BP.



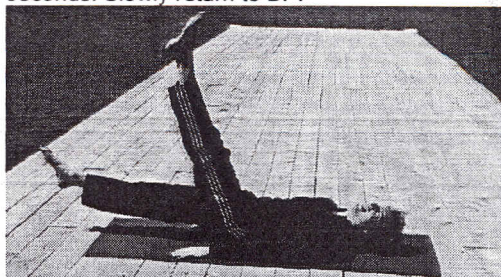
2. BP – On your back, hands behind the head, legs bent at the knees, feet on the floor.



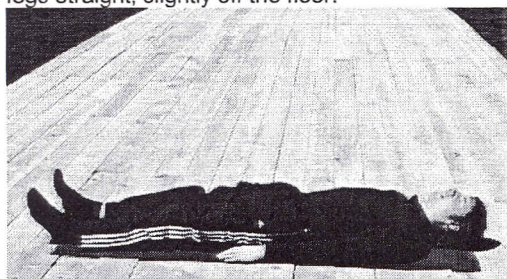
Lift your body up as far as you can. Hold several seconds. Slowly return to BP.



3. BP – On your back, hands beside your body, legs straight, slightly off the floor.



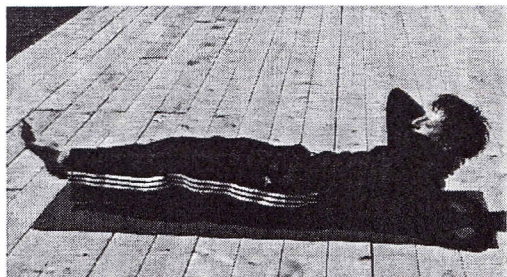
Lift your leg as far as you can, without bending the knee. Return to BP and switch legs.



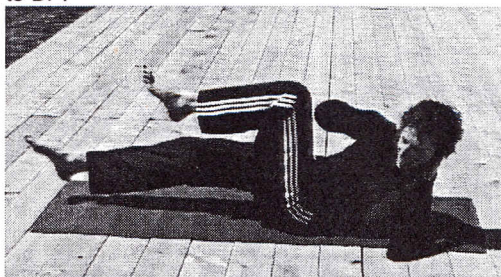
4. BP – On your back, hands beside your body, legs straight.



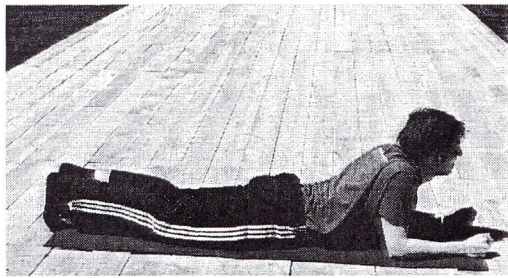
Lift your body up with your hands leading until your arms are parallel to the floor. Return easily to BP.



5. BP – On the floor, legs straight, hands behind head. Lift your legs and shoulders off the floor.

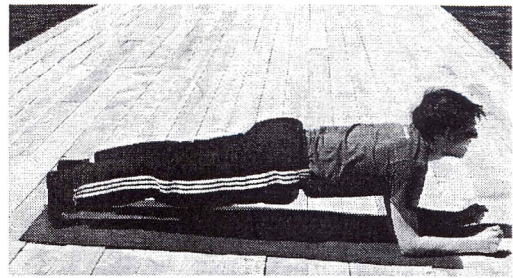


Bend your left leg at the knee, twist at the waist, and try to touch your right elbow to your left knee. Hold for several seconds. Return to BP and switch sides.

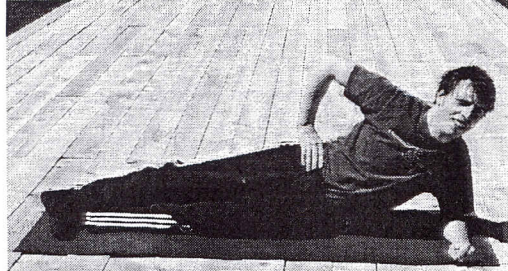


5.BP – Face down, elbows and feet on the floor.

6.BP – Same as exercise 5, just face up. (Note: alternate exercises 5 and 6).

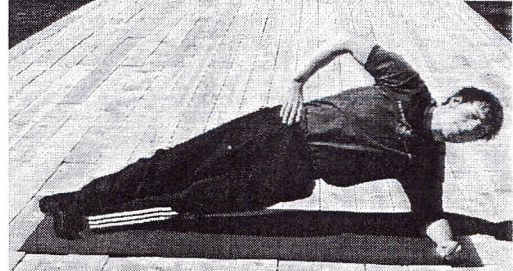


Lift your body off the floor until straight. Hold for 30 seconds. 2 reps.

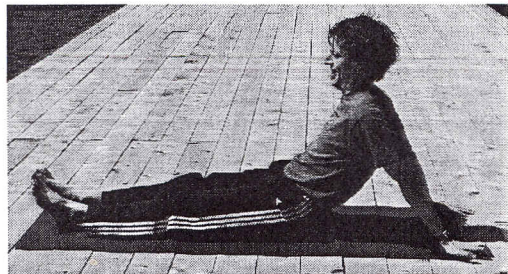


7.BP – On your left side. Left elbow and foot on the floor.

8.BP – Same as number 7, but on your right side. (Note: alternate exercises 7 and 8)



Lift your body off the floor straight. Hold for 30 seconds. 2-4 reps.

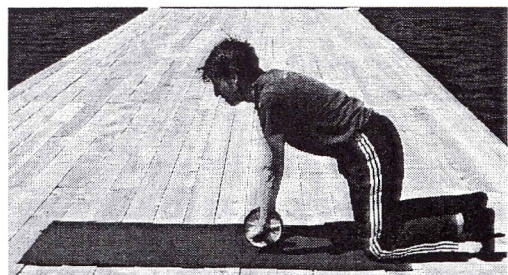


9.BP – Sit on the floor, hands palm down on the floor pointing back behind you.

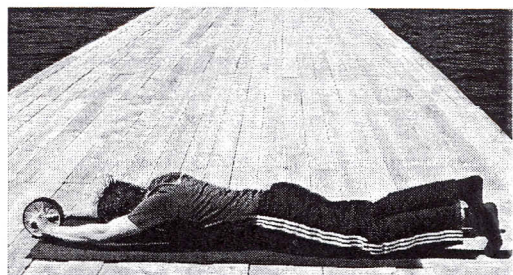


Lift your legs off the floor together. Write the numbers 1-10 with both legs together. Keep your arms straight at the elbows.

The ab roller in exercise 10 is a simple tool, but very effective for core and upper body strength maintenance. If it feels too hard at the beginning of your program, start with a short distance from the wall and use it as a stopper. Every week, increase the distance until you're able to do a few good repetitions without the wall. Then, build your total from there.

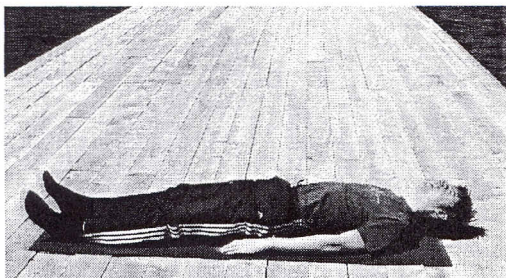


10.BP – On your knees holding ab roller.

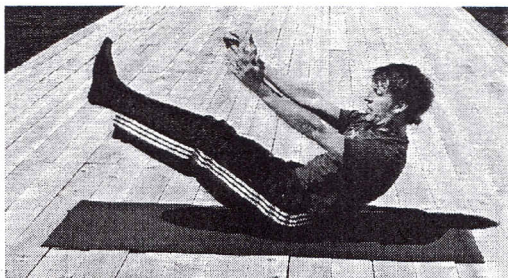


Roll the roller forward until your body is straight. Hold your weight off the floor. Easy return to BP

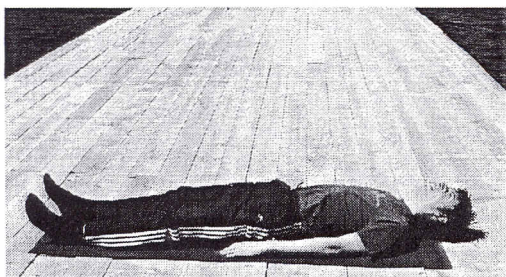
Advanced Core Strength Program



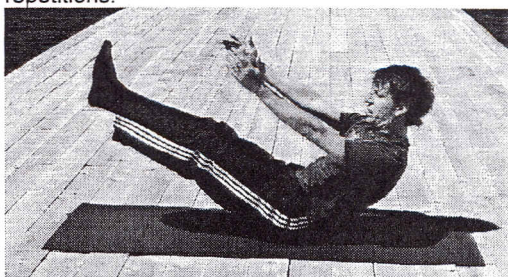
1. Beginning Position (BP) – On your back, hands beside your body.



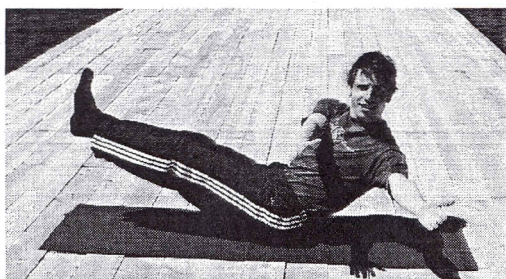
Lift your legs and body off the floor until arms and legs are parallel. Return slowly to BP. 10 repetitions.



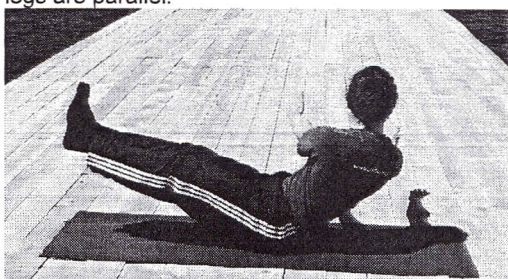
2. BP – Begin as in exercise number one.



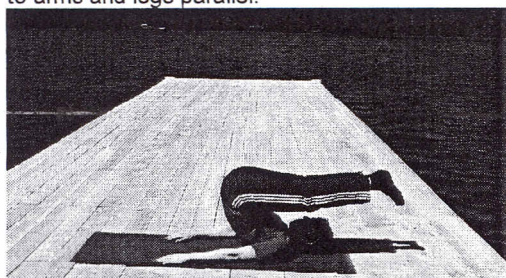
Lift your legs and body off the floor until arms and legs are parallel.



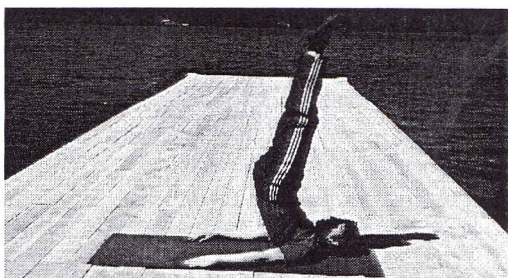
Once the legs and arms are parallel, twist at the waist until the arms are pointing perpendicular to your legs. Hold several seconds before returning to arms and legs parallel.



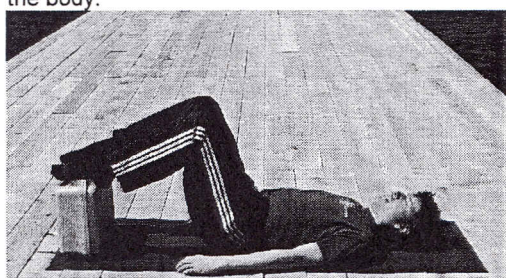
Twist in opposite direction. Slowly return to BP. 10 repetitions.



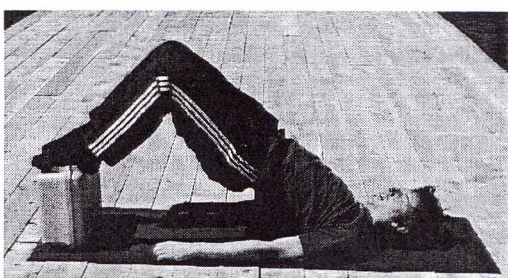
3. BP – From your back with your arms beside your body, lift your legs until they are parallel to the body.



From that position, lift your legs straight up. Slowly return to lying flat on the ground. 10 reps.

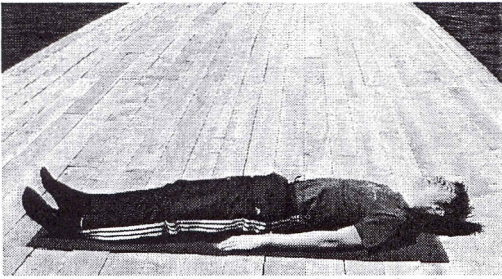


4. BP – On your back, hands beside the body, legs bent at the knees, feet on a bench.

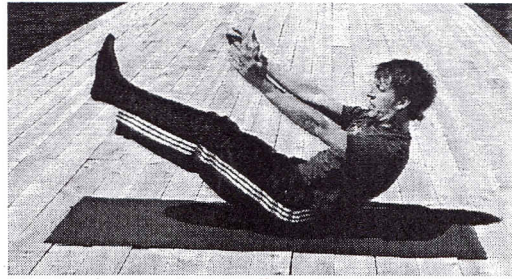


Lift the torso up until straight. Hold several seconds. Slow return to BP. 10 reps.

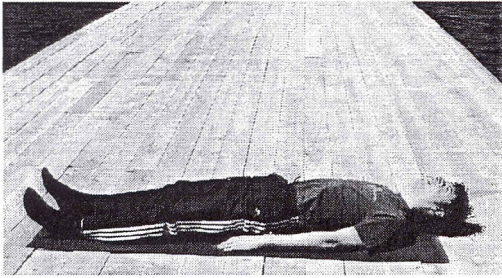
Advanced Core Strength Program



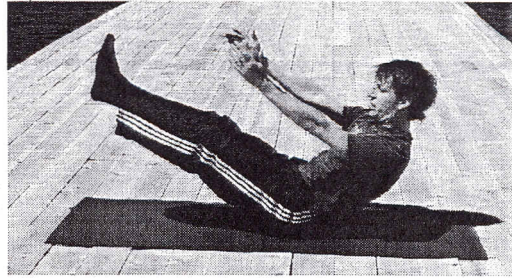
1.Beginning Position (BP) – On your back, hands beside your body.



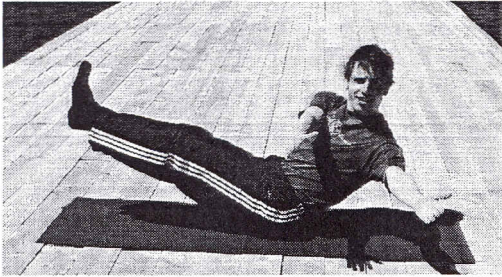
Lift your legs and body off the floor until arms and legs are parallel. Return slowly to BP. 10 repetitions.



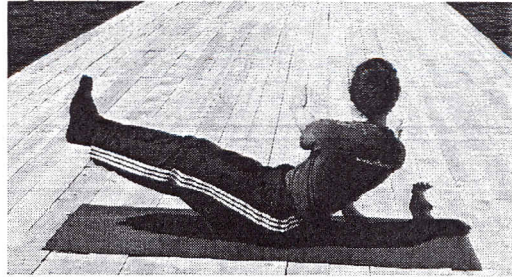
2.BP – Begin as in exercise number one.



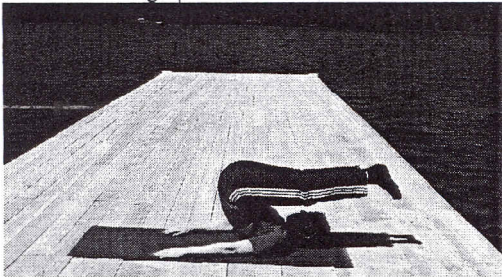
Lift your legs and body off the floor until arms and legs are parallel.



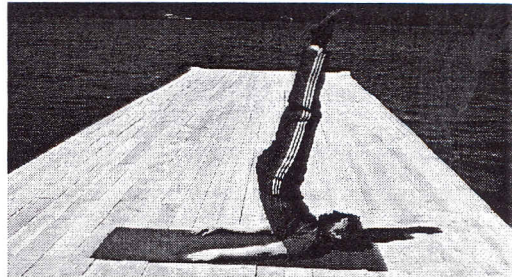
Once the legs and arms are parallel, twist at the waist until the arms are pointing perpendicular to your legs. Hold several seconds before returning to arms and legs parallel.



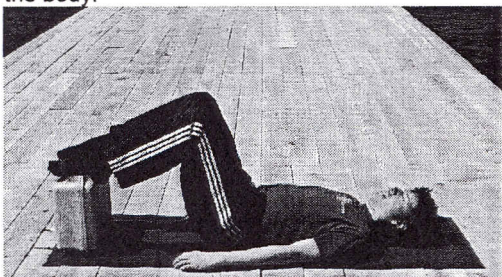
Twist in opposite direction. Slowly return to BP. 10 repetitions.



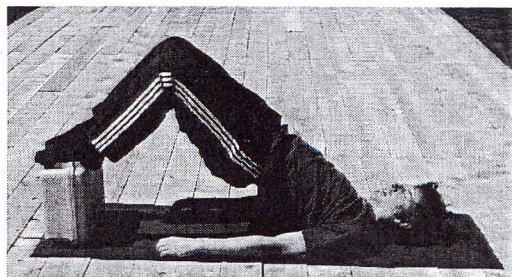
3.BP – From your back with your arms beside your body, lift your legs until they are parallel to the body.



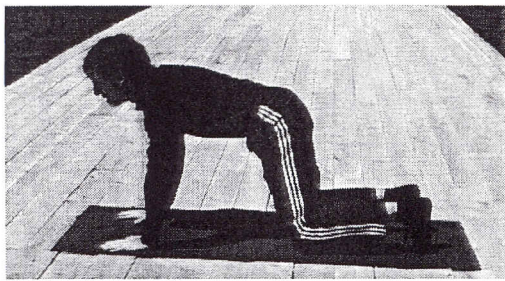
From that position, lift your legs straight up. Slowly return to lying flat on the ground. 10 reps.



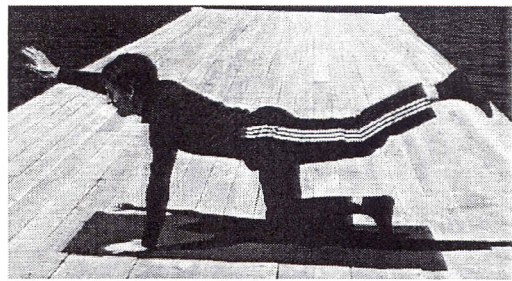
4.BP – On your back, hands beside the body, legs bent at the knees, feet on a bench.



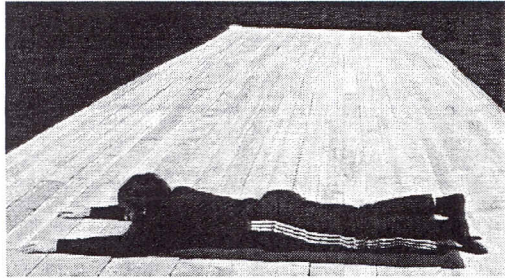
Lift the torso up until straight. Hold several seconds. Slow return to BP. 10 reps.



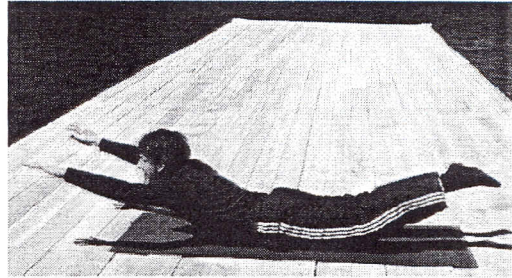
6.BP – On your hands and knees.



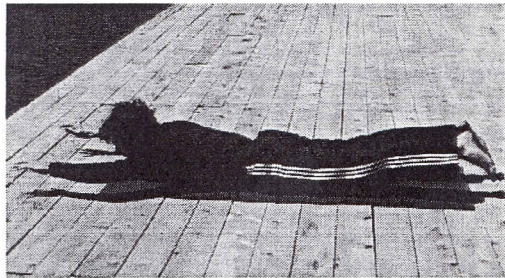
Lift your left leg and right arm up. Hold several seconds. Return to BP. Switch sides.



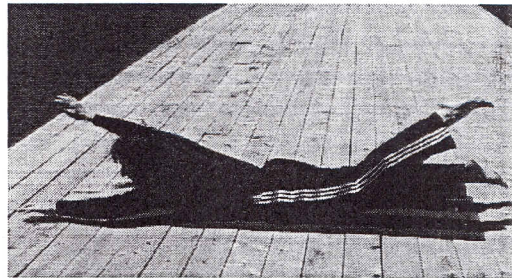
7.BP – On your stomach, arms straight up.



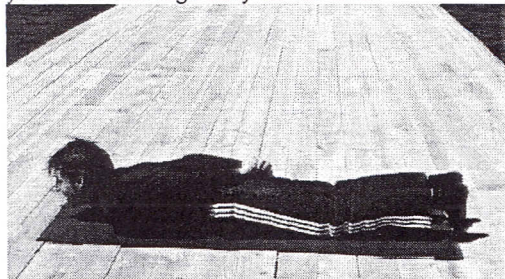
Lift your arms and legs off the floor. Hold for several seconds. Return to BP.



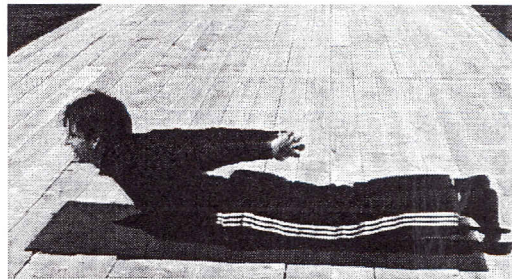
8.BP – On your stomach, arms straight up. Lift your arms and legs easy off the floor.



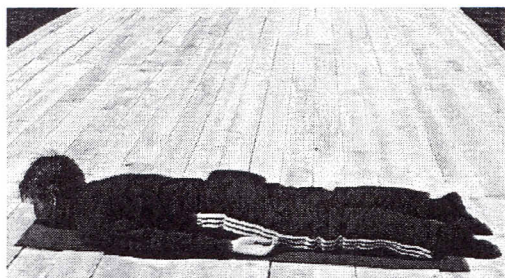
Lift left leg and right arm from floor. Hold several seconds. Switch sides.



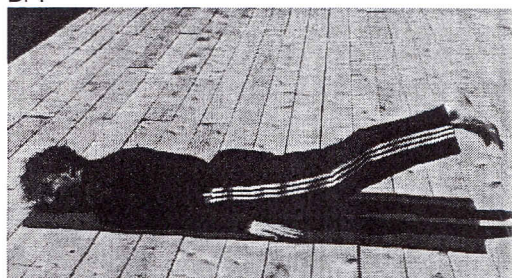
9.BP – On your stomach, arms behind your back, interlace your fingers.



Lift your upper body off the floor, try to reach back with your arms. Keep your legs on the floor at all times. Hold several seconds. Easy return to BP.



10.BP – On your stomach, arms beside the body.



Lift your thighs off the floor, keep your shoulders down. Hold several seconds, then return to BP.