

THE ESSENTIALS OF DEEP DIVING

If this article resembles *'Les Cles de la Profondeur'*, by Claude Chapuis it is no accident and I admit I have in part borrowed unashamedly from his original piece. We are in essence saying the same thing, which is no great wonder great as we have shared great similarities in our training philosophy for too many years and in writing this piece I am paying further tribute to Claude Chapuis, Loic Leferme, Guillaume Nery and Pierre Frolla, not only for *'Les Cles de la Profondeur'* but also for their superb work in forwarding the very best interests of our sport and most of all for an esprit that has rendered freediving accessible to so many who might have been intimidated by it.

The purpose of this article is to bring their ideas as well as our own to an English speaking public. I have wrestled too many times with Claude's English and often lost.

For those who wish to compare and have no difficulty with French I heartily recommend reading *'Enseigner la Profondeur'* ou *'Les Cles de la Profondeur'* and by juxtaposing both articles it is possible to see where they diverge.

A frequently asked question is, 'how can I progress in depth?' The answers to this question are complex but usually can be best answered with another question, 'what is stopping me?' The answer to this usually pertains to 'equalization' or 'concentration', or one other particular aspect of the dive. However, the real answer is a combination of factors where tension, the hydra, the multi-headed monster, is often the main culprit.

But 'why' ah! There's the rub. To this there are many answers.

In this article our purpose is to name the elements of a dive, to show the forces that oppose them, and how best to deal with them and above all to show that the achievement of good and rapid progress in depth is dependant upon successfully mastering the total combination of all these factors together. I have based my comments on the discipline of 'Constant Weights', the most accessible discipline to the majority, but the principles apply to most of the disciplines.

The following suggestions for effectively mastering the main problems of depth are proposed on the understanding that they take place in a safe environment where all the safety rules are respected and that there is a good understanding of methodical progression to allow time for physiological adaptation.

Here I quote Claude literally, *'no performance is the result of a single factor, of an*

exceptional physical capacity, nor a super fin. It is not in effect, because you have bought the fin of the century nor because you have a 10lt total capacity, nor that you are a master of yoga that you attain 87m in Constant Weights. One can more accurately attribute this to the mastering of a combination of different factors which together produce the results.'

Performance is a multi-factoral issue. The main factors involved are:

- O. Physiology and Biomechanics
- O. Psychology and Mental Controls
- O. Technique and Tactics
- O. Constant Weights
- O. Sensory Perception
- O. Equipment
- O. Environment

It is not the subject of this article to discuss the merits of different pieces of equipment, which in the end is one of the least important factors nor to compare specific training regimes, but to offer suggestions to formulate a strategy to combat the effects of pressure and depth, both physically and psychologically, and how best to prepare the diver to meet these challenges.

Initially one of the most important considerations is in understanding stress. Stress is necessary to produce results, but results are not due directly to stress but to the body's adaptation to stress. Too much stress produces stress overload and creates a 'wall' or possible regression.

One of the main factors in training depth is an understanding of:

- O. How much stress to apply
- O. Where to apply it correctly, and
- O. Duration of the stress applied, i.e. in negative pressure dives,(empty lung dives), drastic physiological changes take place in very shallow depths, and it is important that these dives are conducted at a measured pace; racing down and up can severely overly stress the system and is dangerous , effectively will send the wrong signals to the body-mind.

TECHNICAL SESSIONS

If we are 30m divers we do NOT train to our maximum every session or try to exceed it. Introducing technical sessions to your training is an excellent way to practice.

Example 1

- To train the glide using shallow dives, fin to 18m then practice the glide from 18m to 25m. However, **contrary to depth glide training** you would need to be neutrally buoyant at between 8m- 10m (check this by pulling down to 10m then in a head up position with out touching the rope check to see if you float, sink or stay in the same place). If you stay in the same place in relation to a mark on the rope you are neutrally buoyant at that depth. The bottom when training this should be at about 26m in this case.

The glide is one of the secrets of deep diving and needs practice in order to reap the rewards of energy/O₂ conservation that it potentially offers when the technique is mastered and a diver is totally relaxed. This is harder for the mono-finner than the bi-finner and requires more practice.

In order to check one's finning/ hydrodynamic efficiency, try counting your undulations before going into the glide and on ascent. 1 movement should cover about 2m therefore it should take you about 9 movements to attain 18m.

The glide is indispensable for deep diving as it is a colossal waste of energy to fin all the way to the bottom. In order for the glide to be truly effective in deep diving, the following points must be born in mind:

0. The glide must be practiced along a weighted and marked line.
0. A depth must be fixed for going into the glide. This can represent 50% to 75% of the total depth depending on the actual dive depth.
0. Weights must be adjusted to achieve neutral buoyancy at about ½ to 60% of the distance between the surface and the point of entry into the glide.
0. A totally hydrodynamic position must be maintained to minimize drag.
0. The body and mind must be totally relaxed to permit concentration on equalization.
0. The point of entry into the glide should be at the point of 'non deceleration', the ideal entry speed. If you enter the glide too slowly it leads to mental stress and the temptation to make extra movements, too fast and you burn energy too soon and may compromise your ability to equalize effectively further down the line.

Example.2

- In technical sessions it is invaluable to have the feedback of an instructor, a partner or a video in order to observe the following and shallow sessions are ideal for this.
- The quality of your preparation.
- Entry, the duck dive and relationship to the line.
- Head position and hydrodynamic form.
- Rhythm of equalization and if you use your hand for this, how you move and hold your hand.
- Fluidity of movement and finning technique. (look for common faults).
- General speed. This is individual, but a good rule of thumb is roughly 1 m/sec and the dive profile should be equilateral.

Example 3

Remove all watches and gauges, etc.

- Count movements to the glide and then close your eyes (you should be on a leash for this) and totally internalize, feel the water flow.
- Find the ideal point of equalization. If your head/neck is hyperextended this makes equalization nearly impossible.

Example 4

- Practice finning to 20m on a leash with your eyes closed.

Example 5

- During winter training (without a weight belt) technical sessions dominate and are interspersed with negative pressure sessions.

The next period is dominated by tables and negative pressure dives, i.e. dives after a passive, non-forced equalization.

PRESSURE

The focus now shifts to adaptation to pressure. Here the natural tendency when feeling the big squeeze is to tense up. If you allow yourself to do this, your dive is finished. It is not easy to relax in a head-down position while being progressively squeezed at an accelerating pace. Habituation with gradual controlled exposure to increasing pressure is the key.

Furthermore, as the primary physical quality for depth diving is flexibility of the diaphragm, thoracic cavity and spine it is essential in our school of thought and practice, to introduce certain yoga stretches, 'asana', to your 'dry' training program.

Refer to the 'Freedivers' manual or consult a good yoga instructor for the relevant asana and for explanations on how to practice '*Udhayana Bhandas*' safely.

You must be soft, you must become water.

TECHNIQUES FOR DEPTH TRAINING

Three techniques we have found to be invaluable for depth training:

- Negative pressure dives
- The Free-divers' version of variable weights (head down eyes closed).
- Air Packing - first used in Freediving by Bob Croft in the 1960's.
- A methodical, patient approach to depth, not more than 1m per session, to allow time for physiological adaptation.

Negative Pressure Dives

Under these conditions we must understand that extreme physiological changes take place within a very short distance from the surface. So, the descents **must** be slow.

No weight belt for N-P Dives. The weight is unnecessary as buoyancy is greatly

reduced by expelling the air from the lungs and is in fact dangerous as one can sink too fast to equalize.

- Head down position as in C.W. or Free Immersion.
- We favor a controlled pull down and pull up as there is less chance of damaging the ears or sinuses.
- Never compare yourself to your partner. In this exercise a lot about depth achieved depends on exactly how much air is retained. Your partner may not be able to attain your depth in N.P. dives but still may out perform you in C.W.
- We teach this technique only to divers who can demonstrate a static, empty lung breath hold of 1 1/2 -2 minutes. Initially all descents and ascents should be accomplished by pulling on the line so that one never passes the point of equalization. Only after much practice with this technique will an advanced diver be able to fin down in 'Negative Pressure' safely.
- Very often, when there is a lot of current, we will devote a whole training session to negative pressure dives varying the amount of air retained in the lungs but avoiding pushing too hard for depth on totally empty lungs too often.
- The main concentration here should be internal and eyes closed, is recommended.
- Observe, feel and understand the sensations and how you are reacting to them.

What happened to the air you retained in your cheeks- did it disappear?

Where did it go? Could you bring it up again?

What happened to the air in your mask? When did it disappear? Did you sniff?

If you were without a mask in a nose clip_ did you swallow air, etc.?

- Finally for more advanced divers descents finning on empty lungs in shallow (5-8m) depths.

Variable Weights

Freedivers have long employed a version of variable weights for depth training, the diver simply holds a line about 1m above a 10kg - 15kg weight. The other end of the line is cleated off at the target depth and the diver drops the weight. He can let go at any time or employ the slip and hold technique. He descends head down and eyes closed **without a weight belt**. Thus the ascent is extremely easy.

For this exercise we employ a counter-weight and leash system for security and a very rigid safety protocol. This should not be attempted without these measures in place.

Air Packing

When talking about attaining depth this subject inevitably arises. It is being sold today as the secret of the champions and the un-stated implication is that it is a magic carpet that will take you from 10m to -60m plus. Would that life were that simple!

I will discuss it's pros and cons and how it intermeshes with other techniques in my next article on equalization. However it's origins are interesting. The earliest record of anyone air packing as far as I have been able to ascertain is it's use by the great American World Champion of the Sixties, Bob Croft. Bob did claim it to be the secret of his success. Bob relates that when he was a child he suffered from rickets and a consequent mal formation of the chest and he had a difficulty in falling asleep. This was the technique he taught himself as a child to expand and relax his chest and thus to achieve and state of relaxation that permitted sleep.

Bob claims that his rival Jacques Mayol used to come up close and stare in his face and try and figure out what he was doing, while he was ventilating before a dive.

Bob taught this technique to me in his living room some 20 plus years ago, which began for me, a path of discovery in learning its advantages and limitations and how it interfaces with other techniques that make it even more effective.

The Mental

Every one of us feels the same fears and distractions. The environmental distractions of current, cold, poor visibility, waves, etc. and the fears of blacking out, being short of breath on ascent, and during a competition focusing so hard on the depth to be attained that one leaves the first equalization too late resulting in an inglorious return to the surface.

If a diver does not train himself to be strong mentally he can be distracted by anything- a mask fogging up and inability to hold correct orientation on the rise due to waves and current being in opposition, annoying short chop,leaking mask, inadequate warm-ups, 'I forgot to stretch', etc.

The qualities to be cultivated are; self-confidence "I can deal with Murphy," the ability to concentrate and relax immediately, and a lack of being spoiled.

The basic methodology is as follows:

- Progress must always be from the known to the known i.e. if your limit today is 30m and you have done it ten times and you can spend 5-10sec at 30m then it is realistic to attempt 31m. On the other hand, to immediately attempt 35m when you have only done 30m once is to pass from the barely known into the unknown, a frequent recipe for disaster.
- Advance 1m more in depth per training session and not more. The secret here is regular training and a systematic and gradual approach to depth.

Our nightmare is the student who has booked two weeks with us with an objective of progressing from 20m to 50m in that time.

Here, I totally agree with Claude, there is no way to do this in a controlled fashion. One meter per session!

- Avoid being the spoiled diver who needs 20 minutes of ventilation in order to attempt 20m, or the diver who does 30 packs before going to 10m or the diver who needs to compose himself with meditation and tapes for 1hr before attempting 30m.

Instructors become very proficient at going down with a minimum of preparation. You have just finished giving feedback to one student when you realize your advanced student is about to go down to 50m and you are going with him and he is now beginning to pack!

You soon learn that you can do amazing things with very little preparation and your mind accepts your fins leaving the surface as a signal for total relaxation - you have to, you're committed.

You only need two or three big breaths to totally re-oxygenate - the rest is relaxation and concentration and to a certain extent the speed at which you achieve this is due to habituation.

- With some students we have found it helpful to go down with them in tandem as this helps to diminish fear of depth.
- Sometimes we have found it helpful to have the weight 1m above the bottom so the diver has a point of reference and feels more secure.
- Another important question is the way that you talk to yourself before and during a dive. "I must get to 40m" doesn't work. Usually the diver is so concentrated on the tag that he forgets the first equalization and never gets there.

If on the other hand you forget the depth and focus on the first equalization and time it perfectly then your subsequent shifts of concentration to the next point of focus are always building on the success of the last.

When in competition you are preparing on the line and you say to yourself.. " I must concentrate!" **WRONG** - you are telling yourself that you are not concentrating now - and there is something stopping you from concentrating.

- To avoid becoming the spoiled diver train yourself to go down with a minimum of preparation or when someone else cues you.
- Avoid getting attached to a magical piece of equipment. "I can't dive because the dog just ate my 'Doc's Pro Plugs.'" Learn to improvise or do without. Don't complain about anything, just do it.

THE SENSATIONS

Try to vary your environment as much as possible, time of day, place, tide, etc.

Become less dependant on mechanical devices - watch, depth gauge, etc. Learn to count your fin strokes, listen to your ears, watch for the thermocline. Be aware of the diminishing light or it getting lighter as you approach the surface.

In summer dive in a skin or just a bathing suit to feel the flow of water along your body and study it's behavior.

Soon you become much less disoriented in water, or you become less dependant on mechanical things and much more at home.

Don't forget that freediving is a pleasure, not something you drive yourself to achieve, achieve, achieve! Some of the most profound progress can come when we are totally involved in play.

Near our camp we have a sea lion colony and I have watched divers do incredible things while interacting with the sea lions, and it's not just sea lions in the Baja but whales, dolphins, manta rays and more.

In the pleasure syndrome we achieve the dream. Don't forget to smile.

STYLE

One area where we perhaps differ from the French is in the question of mono-fin technique. Let us first 'render unto Caesar what is Caesar's'. The Russian mono-fimmers have perfected the movement with this tool. Sorry guys it doesn't matter whether you're going in the horizontal or the vertical the problems and solutions are the same. Yes, I know their objective is speed and ours is not, but meditate on this; in order to achieve speed the propulsion must produce the maximum forward movement with the minimum force wasted on opposing drag, i.e. maximum hydrodynamism.

Now the problem is this - this may be inarguably the ideal but won't happen when I have not got their flexibility - and I have a wet suit like a suit of armor, and I have to overcome buoyancy.

My style may not be perfect, but our feeling is that as long as we maintain the aspiration to the classical style and approach it as closely as possible we are going in the right direction. The big impediment for most guys is stiffness in the upper back and shoulders, so work on it. Yes there are exercises for improving flexibility in this area.

We define common mistakes as:

- O. The Plank - Here the whole body is rigid and the propulsion comes from the lower legs by bending the knees. The motion is a kind of Start - Stop, one.
- O. The Mechanical Butler - He looks like a wind up toy doing mechanical Japanese bows. Here, half the body is propelling forward and the other half backwards. He ain't going very far.
- O. The Snake - The snake swims with a languorous fluidity, which is aesthetically seductive, but has the disadvantage of actually having traveled a much greater distance.

Take a good look at Molchanova's movement and get back into flexibility exercises and stop trying to make virtues of limitations.

One final thought. Everybody likes to show off and work on what they do best, but he who works on his weaknesses and turns them into strengths becomes Superman!

A 10% improvement in style = 10% improvement in results.

A 20% improvement in fitness invested in poor style may equal zero improvement.

IN CONCLUSION

- O. Don't do maximums all the time

- 0. Make your worst day your best day - if there is a big current work on negative pressure dives, don't give up and go home.
- 0. Don't have ten objectives in every dive. Give each dive a single theme.
- 0. Vary your training to avoid monotony.
- 0. Dive safely and never alone.
- 0. Be patient and methodical in approaching depth.
- 0.

DO NOT PROGRESS TO NEXT DEPTH EVEN IF IT IS ONLY 1 METER IF YOU CAN'T
EQUALIZE ON THE BOTTOM AT THE LAST DEPTH!