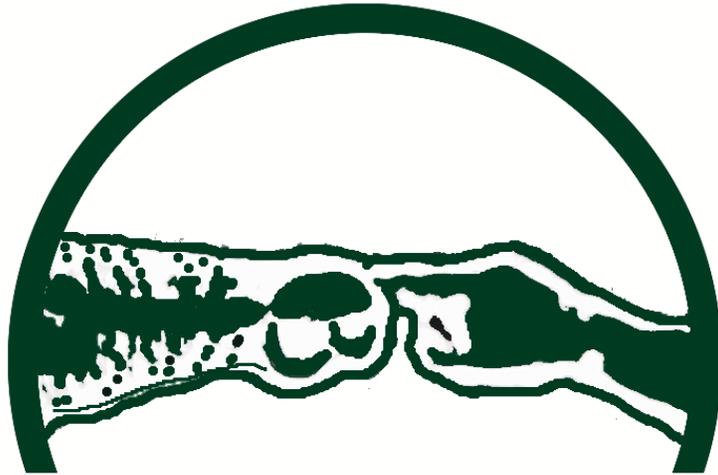


Elephant Management.

A collection of unusual topics.



Elephant Business

Collecton 2.

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A Jumbo Job?

Transporting seven elephants from the old house to the new house at Copenhagen Zoo, in three days.

Written June 2008.

Copenhagen Zoo entrusted me to plan, arrange and implement the translocation of seven elephants from the old elephant house to the new Norman Foster architecturally designed elephant house. I was extremely grateful for the chance and honoured that the zoo would entrust such a delicate task to my care. Such an undertaking I could have never done alone. The experienced Copenhagen elephant staff were there to help with the process and I had suggested hiring two persons (Stefan Groenveld and Stefan Aspegren) that I had already worked with in other institution to assist with the training implementation while I was away, I would stay at the zoo two weeks a month for two years not only to oversee the transport progress but to introduce further development in elephant and keeper training in the new house.

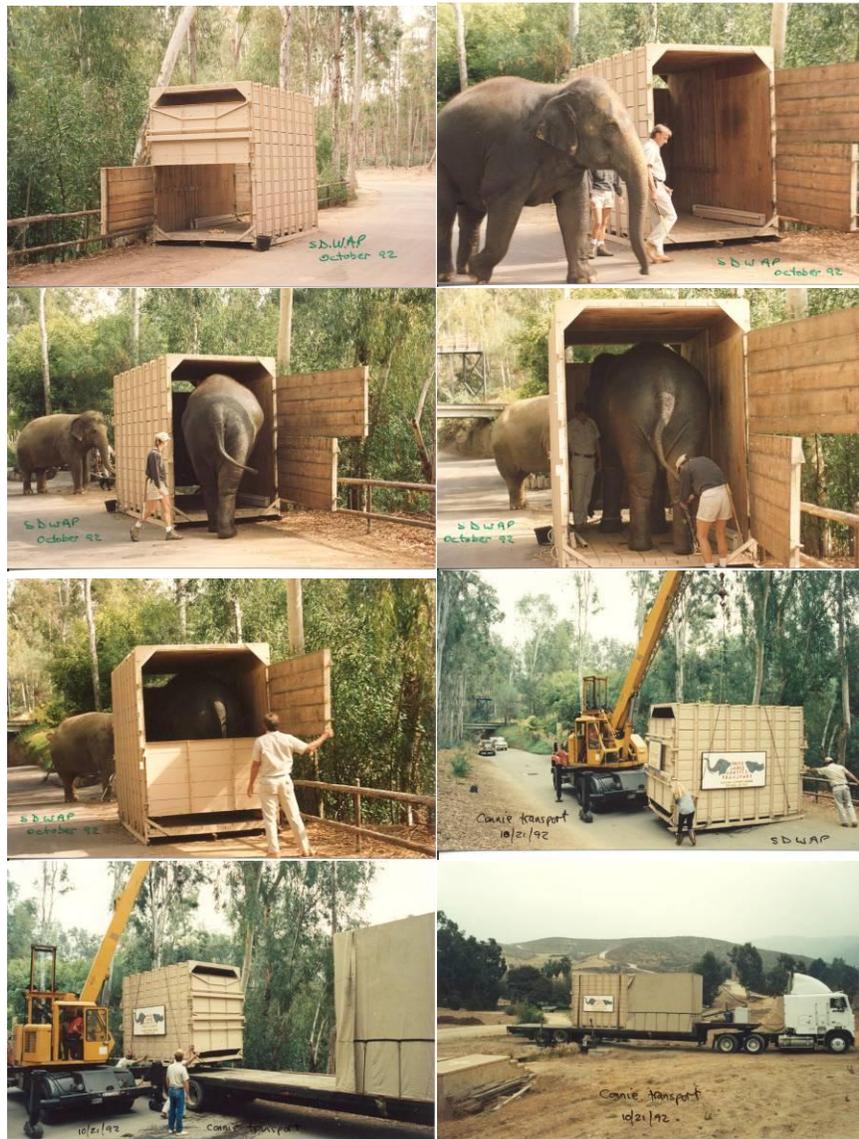
So what were the challenges? Nothing, one would say, nothing more than any other elephant transporter has faced in the past. Only this is seven elephants in three days.

The elephants to be moved were a mixed bag of ages and behavioural profiles, we had one 50 year old breeding male elephant with an extremely delicate nature and was potentially scared of everything around him, except when he was in musth, when the world belongs to him. He is one young male with an attitude. One older ex-circus elephant that I am sure was not taken back to her old days in the lime light by being loaded into a crate. Two young females who were part of a gift from the King of Thailand to the Royal family of Denmark and last but not least, Ida a old female with her two year old calf Gandhi. The combination of mother and calf was, in my eyes, the biggest concern from the start. All of the elephants are Asian and for those of you who do not know Copenhagen Zoo, their elephant program has had a breeding reputation for many years with babies from Plaisak, the old adult male being sent and forming their own breeding groups far and wide in Europe.

Well, my little known history has involved me in transporting elephants across the USA in the 80's and from north to south of the west coast and even one male from Houston Zoo to the Berlin Zoo Germany, that one was by plane, quite another story with far reaching consequences when you are 39,000 feet above the Atlantic.

Just as one example, I moved an elephant from San Diego to Columbus, Ohio in the early 90's. Connie was her name, this young Asian female elephant was moved to the Columbus Zoo for breeding.

Having watched and helped when Karl Kock elephant manager loaded and unloaded elephants at Hagenbeck's Tierpark, Hamburg in Germany, Hagenbeck's Tierpark is a long established zoological institution and was the zoo I received my formal learning and after an eleven year apprenticeship with a one year employment notice, I took my newly gain knowledge to the USA, San Diego via Miami to be precise.



Free Contact handling of elephants allows for many corners to be cut, when you can just walk an elephant into a crate the process is simplified and possibly reduces if the elephant has a familiar person travelling with it, a person it trusts and has a bond with, but not every elephant that is transported is in FC or in a trusted relationship with its keeper, even with FC. The desensitization process must be carefully planned so the elephant is comfortable and above all arrives safely and healthy at the destination. Connie, the elephant in these photos above was a well trained calm female elephant and at the San Diego Wild Animal Park she was walked around the park and performed in public demonstrations on a daily basis which laid the foundation and accustomed her to be away from the main group of elephants for training. Twice during the walks she was taken through the crate where finally the doors were locked behind her during training so she knew she was getting out of the crate at some point in the process. The only things we could not desensitize her to would be the crate moving and rocking

as it was lifted and being on the road and of course the duration of time from the doors being lock to the door opening again, although we would climb on the crate during training to prepare her for most events. Back then we moved a number of elephants in this manner with different designed crates. Planning and experience is the key to this process and even thou I had many experiences with moving elephants I would consultant with close friends who moved elephants and other knowledgeable transporter. Cross country move are hard on elephants and their comfort should be a concern, we would organize zoo stops along the way at places where we knew we could rest and take on pre-ordered supplies and in some places we could also take the elephants out to stretch their legs get a bath and lie down without the restriction of the crate. This is not the case with all elephants, less tractable animals, bulls for instances, would travel in differently designed crates with more room to move and even a possibility to lay down. The stopovers are equally as important when moving less tractable animals because their rest and comfort should be high on the priority list, as high as food and water. Connie arrived in Columbus safely and after some years at the zoo, conceived and gave birth, a complete success for all concerned.

Elephant Transporters.

Working both sides of the Atlantic I have met, probably all of the regularly presently employed elephant movers. In the United States Eddie Novak is the elephant transporter everyone uses to move elephants between zoos, circuses and sanctuaries. Eddie is based at the Catskill Game Farm in upper New York State. Eddie has been moving elephants as long as I remember, over twenty-six years and probably before that given the number of elephant's people says he has moved.



In Europe there are more transporters; the two main outfits seem to be Roy Smith based in Germany and EKIPA out of Holland. Roy a regular lecturer at the "First Elephant Management School" held in November every year at Hagenbeck's Tierpark in Hamburg, Germany. I have known Roy for long time and he has developed equipment, methods and a philosophy, it seems, everyone has been copying over the years. EKIPA is also an experienced team of people with connection to Van Den Brink the famous animal handler also based in The Netherlands. All of these movers will transport other animals through-out a given year.

Protected Contact and Crate Training.

Training elephants to go into a crate for transport is not new in the business. We have desensitized elephants to boxes in our zoos over the years in many ways, but many times baiting and trapping of the elephant is the end result. PC training can be used to establish a foundation of understanding between elephant and keeper with the end result is that the elephant stand stress free in a box ready for transport.



Creating that understanding is done on a daily basis in the form of a wash and care routine. Teaching the elephant to present its feet for inspection and grooming at a specifically designed PC wall can then be transferred into a crate, a crate that has been specially built with target access ports and foot ports for foot presentation, restraint and comfort.



You must find the most expedient location for the crate adjacent to the house or yard so access to the crate is not too expensive, big cranes must be use when you place the crates too far away and at \$ 1000 an hour including set up time the bill run up, also close placement provides and all lifts and movements are quick and not too high.

At the Copenhagen Zoo training procedures are established inside the house during daily husbandry and welfare routines and can then be repeated in the crate giving the elephant as much heads up as possible. Plaisak was targeted into the crate using the target ports, the crate gave him also good visibility and the feeling of control a crucial aspect to crate training elephants. First a bracelet was attached that Plaisak carried till he was transfer to the new house. Every day during training the transport chain that is fastened to the outside of the crate is attached to the bracelet, leaving it reasonably long at first so he can take a short step and move around at the front of the crate. The space provided in the crate was sufficient for him to move generally from side to side and lift his feet comfortably and as an added enhancement the inside of the crate was painted white to give more of an open feeling. From the first time in the crate Plaisak appeared to be comfortable and in control.

Mother and Calf.

For the mother and calf move we designed and built a crate with two compartments. One small compartment at the front for Gandhi and a larger area behind for his



mother Ida. The crate was placed in the outside yard for the elephants to pass through and become familiar with over a week before the move. Ida because of her unstable stance has a history of falling over so the crate was built wide enough to accommodate this occurrence with straps under her belly to lift and help her if this should happen. Sand was also placed in the crate to soften the flooring so she could get a better grip as she stands. Both animals were given a slight oral drug cocktail by the in house vet Dr Carsten Grondal to take the edge off them during the lifting and moving. The design of the front compartment complimented the mother and baby bond, she had full contact with him during the whole procedure and he could move around in his area to either face his mother or face the front as he wished. Ida was not restrained in the crate and spent all of her time right next to her calf. This was by far the most stressful move on our agenda and gave us the most cause for concern as Ida is extremely delicate and not stable on her feet at the best of times. The whole team pull together and quietly and professionally moved her without incident over to the new elephant building.

Side Benefits of in House Desensitization Training.

The ability to train animal keepers in the process.

Anyone who has moved elephants knows it takes experience and an elephant transport cannot be undertaken without planning, it needs teamwork and good people helping you. Another component I see as a positive aspect of desensitization training is the learning process and experience curve that the elephant keepers must go through to complete the task of crate training an elephant in house. Cost is a concern when moving elephants and the way we moved these elephants at



Copenhagen Zoo was probably not cheap allowing for all the support people we have around, it was however, a tremendously productive staff education process, everyone involved learned so much about the process of moving elephants, team building and communication and we all learned more about the animals we care for, Plaisak the 50 year old male, for instance, was before the move thought to be a nervous even delicate animal, but through the planning and crate training process he turned out to be a strong well balanced character who took, it seemed, pleasure watching the new world go by through a target port hole as he moved through the zoo out the gate and around to the new building.

The Copenhagen Zoo elephant team was very professional and performed exceptional work and with their knowledge of the elephants became a crucial component of this procedure. Knowing the limitations and behavioural profiles



of each animal was invaluable information to have when moving so many elephants in such a short time.

The Copenhagen move brought many different disciplines together, the police were present to direct traffic and keep people back while we moved the elephants on the roads around the zoo, the crane company that supplied four experienced people to lift, slide and position the crates and the zoo had hired a company to help with circumstances where we needed to pull large equipment.



Parting Words.

Copenhagen Zoo is committed to best practises and animal welfare in every sense of the word and demanded from us a high degree of quality in all details of the elephant program. It started for me when we introduced the PC training with the males and it has continued when we started the crate desensitization and moving of the elephant into the new habitat. Our task now is to create a world class

elephant program that stands alone in quality, attention to detail, where elephant biology take centre stage and our zoo guests can observe elephants at any time of the day or night, acting normally and projecting a message of education and fascination.

Spin off's

My focus for a number of years has been a goal of training and empowering young people into the business and I would like to think that our elephant move that ended in the successful translocation into a world class elephant habitat was only the start of the story. I would like to think that a child after leaving the zoo on any given day will fall a sleep at night with an image in their minds of elephants digging and rolling in sand after a bath in the pool or watch them reaching with its trunk for food specially placed in hanging apparatus highlighting the flexibility and dexterity of the trunk while noticing the musculature of their legs and shoulders.

I would like to thank the management of the Copenhagen Zoo for having the insight and for knowing how important the process of an in house crate training process would be to the elephant staff and building a stronger moral with the elephant team all teams connected to the elephant department during this procedure.

Acknowledgements.

I would like to recognize some of the zoo team who made this whole process a success and possible.

Copenhagen Zoo Management for their faith in this system of moving elephants. Copenhagen Zoo Elephant staff for their hard work and attention to detail. Copenhagen Zoo Veterinary staff for their unbelievable elephant knowledge. Copenhagen Zoo Behavioural staff for their support and encouragement. Copenhagen Zoo Maintenance Staff always there when you needed them. Copenhagen Zoo Gardening Staff always willing to move a tree. Kenny from port/gate 3 for his never ending smile. Copenhagen Zoo Restaurant Staff for the excellent food after our success.

A Short Foot Work Overview. Written June 2009.

A guide to quick efficient pedicures on Asian elephants.

Introduction.

The following information has been written because I feel there is a mixture of ideas on the way general foot care is performed with elephants in our zoos, therefore a structured implementation system would make it easier for a keeper learning how to do foot care and a not so experienced person teaching the foot care. The system I am suggesting allows for all people involved with elephant pedicures at a zoo or anywhere for that matter to follow the same techniques and application. This system does not cover damaged feet or any other abnormality.

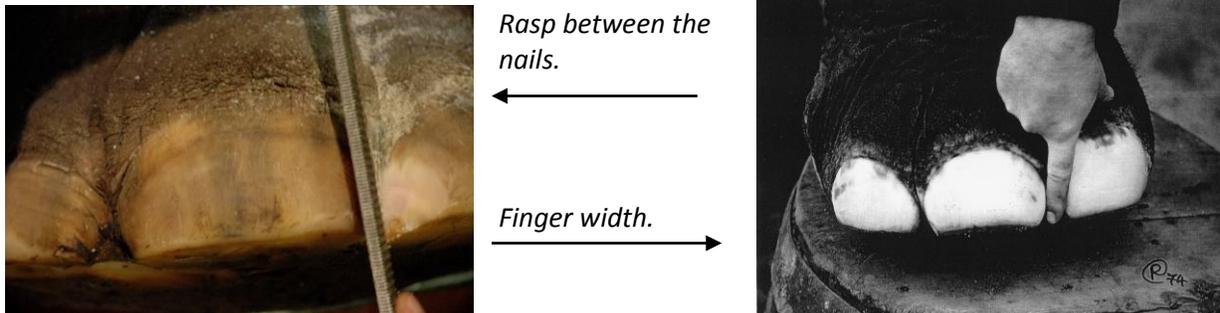
From left to right.

This system in principle is a little unfair to people who are left handed and use left handed hoof trimming tools. However, most of the people who I work with, it seems, use right handed tools so this information is directed towards them. There are firstly a couple of identification issues I want to get out of the way before we start the guts of the info. We count the nails on an elephant from the inside out. Meaning, if we place our hand on the table left hand or right hand your thumb is number one digit, likewise with an Asian elephant front foot the little nail on the inside of the foot is nail number 1. Then counting 1, 2,3,4,5 the outside nail is number 5, unless by chance your elephant only has like an African 4 nails on the front, this is very rare but not out of the question. It makes it easier when you are talking to your colleagues or asking for advice on the internet to identify the nail you are talking about by a number, it becomes common dialogue basically. Very simply, if you start with the right foot, open up the gaps with your rasp between nails 2, 3 and 4 so there is sufficient space between these nails. The creation of space



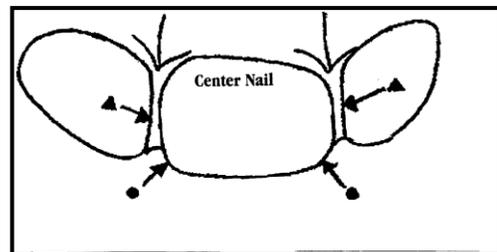
will allow your small knife to fit between these nails when you get to removal of the cuticle. After sufficient space has been achieved take your small knife and remove cuticle from left to right on the nail, from nail 5 and do this on all of the nails. See in sections below under “space between the nails” and “attention to the cuticles” for more details concerning these areas.

Space between the nails.



One finger width between nails 2, 3 and 4 is generally a satisfactory distances so the areas can drain and dry out completely. One thing to remember on a normal foot, a foot that doesn't have any irregularities is that nails 2 and 4 will crowd nail 3 the center nail so removal of most nail will generally be focused on those areas on 2 and 4 closest to nail 3.

The diagram to the right indicates two things one the little triangle show the growth of nails 2 & 4 on either front foot in towards nail 3 the center nail and the small black dot is a reminder not to take too much of the side of the nails with your rasps when creating space and fine filing the nails.



Attention to the cuticles.

The cuticles are the most sensitive area of the feet and need special understanding and attention right from the start. The trimming of the cuticles is in my experience with all the elephant that I have interfaced over the years is the area of pedicures where elephants get hurt the most. So, having said that we must pay extra attention to our technique and implementation when operating in this area particularly in Protected Contact, because the elephant will lose confidence and either walk away and not come back or far worst, start to become aggressive and lash out during sessions. A very sharp and thin knife is the key to this procedure because the cuticle must be removed without sagging or pulling on the cuticle. The other



important aspect to keep in mind when trimming cuticles keep the foot moist with water not oil, and goes with saying try not to cut too deep, there is an area when trimming the cuticle that lies just above the blood and nerve line and if found will allow for cuticle removal without discomfort. With elephants that are sensitive or scared when approaching the cuticles a rasp will remove the cuticle with less stress than a knife, just be sure you don't dig into the top of the nail with the edge of the rasp as you remove the cuticle.

When removing the cuticle using the method I am recommending you start from left to right removing the cuticle from the nail on the left and finish on the nail on the right. The space between the nails you created at first will now allow for extra tissue removal while going from nail to nail. Also remember the space you have created between the nails acts like a drain and if sufficient will allow all moist, water and urine to drain out leaving the foot drier longer.

Reduce the size of the nails.



The nail size is a very important aspect for consideration. Number four nail for instance if allowed to grow too long can cause pressure problems on the foot over time. Consider this for one moment. In an elephant that sways or has a rocking habit, generally speaking with behaviorally abnormal elephants, nails two and three wear because of contact with the ground as they sway so nail four does not receive any wear and will grow long. Now, other facility and behavioral habits come into play, if the elephant for instance has stop laying down it

will stand to dose and rest. Nail four under these circumstances hits the ground and pushes up into the cuticle causing over time hot spots at the cuticle line and a hematoma inside the nail and then what we call an abscess. So keep all nails that have a tendency to grow too long because of abnormal wear short.

Fine filing.



Using the fine side of your rasp gently remove a layer of the nail; now remember you are only removing a fine layer not reshaping the nail. If your nail is a good shape do not rasp.

Never use the rough side on the face of the nail.

The nail is not a piece of wood you can rasp and re-rasp. One benefit from fine filing is the exposure of abnormalities within the nail, if say, there is a hematoma inside the nail the fine filing will show the shadow within the nail so you have more information about the condition of the nail and

the elephants behavior.

Abnormalities.

Just a quick word concerning abnormalities. Abnormalities in your elephant's behavior should be dealt with immediately and not left to become habitual.

Abscesses: Are a symptom of a behavioral problem which might arise from stereotypical or repetitious movement.

Cracks: Are a result of the weakening of the nail casing.

Flairs: Are caused when the nail is allowed to grow too long and the elephant suffers from repetitious swaying movement redirecting the nail with the abnormal pressure.

Injury: Accidents.

Tools.



Small hoof knife.



Large hoof knife.



Rasp.



Shapening stone.



Hoof knife hone.



Not recommended to use mechanical tools on the nails.

Conclusions and Benefits.

Why implement this method? If you have one or two elephants and you work with these elephants 24/7 there is no reason to implement this method as long as you know what you are doing and have an understanding of elephant foot care. But let's say you are in a large team of people with new staff members, new people need to learn about foot care. Having a method under which everyone can operate is beneficial to all.

Elephant Foot Care as a Culture in your Zoo.

Factors that could influence a foot care program.

1. Philosophy of institution.
2. Type of contact allowed.
3. Competence of personal.
4. Behavioral disposition of elephants.

Husbandry practices necessary for healthy feet in elephants.

1. Sufficient exercise
2. Proper hygiene.
3. Regular pedicures.
4. Natural substrates.

Components for appropriate foot care programs.

1. Experienced staff.
2. Trained elephants.
3. Access to feet.
4. Reliable equipment.
5. Proper facility design.
6. Sufficient time.

The foot pedicure.

1. Species difference.
2. Correct equipment
3. Foot positions.
4. Approach and time frames.
5. Nails.
6. Cuticles.
7. Pads.

Common problems associated with elephant feet.

1. Abscesses.
2. Cracks.
1. Pad over growth.
2. Nail Flairs.
3. Excessive cuticle growth, that creates water pockets.
4. Insufficient space between the nails.
5. Excessive growth of nails. (Nails are too long).

Conditions that can lead to foot problems.

1. Conformation.
2. Abnormal behaviors.
3. Trauma.
4. Arthritis.

Support aspects in the prevention of foot problems.

1. Expert consultation & evaluation.
2. Anatomical knowledge and function of the feet.
3. Recognition. "Know what you are looking at".
4. Facility design.
5. Individual elephant behavior. "Know what your elephant is doing".

PC, Chutes and Drugs.

Written August 2008.

There are a few things we should know about our capabilities and with this article I hope to clarify the strength and weaknesses of Protected Contact.



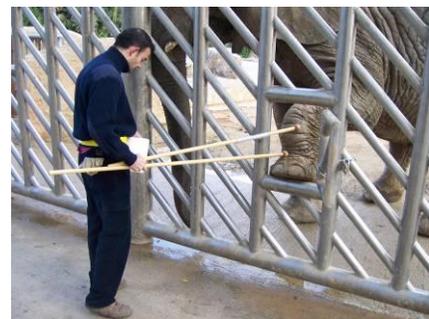
Addressing elephants needs in captivity can be challenging so we must be resourceful, proactive and visionary. EAZA, BIAZA or AZA have written clearly stated zoological mission for us to use as a guide and with the changing times we must be professional with an ability of keeping our clearly stated zoological mission in front of us for all to see and use.

In PC there are three ways of gaining safe access to an elephant for husbandry, minor-medical treatments and surgery. One, is by means of training and a carefully design protected wall, two, is in a ERD, "Elephant Restraint Devise" where the elephant is contained in specially designed metal chute. The number three point can be broken down into two areas, standing sedation and immobilization.

Protected Contact is a method of training using positive training techniques, targets, food rewards, body positioning and lastly a specially designed protected wall. This method allows for safe access to all elephant tractible or untractible animals.

The list below highlights the areas of access.

1. Blood draws, blood assays, health & viability testing.
2. Tail access, removal of in-growing hairs tail soaks removal of dead skin and immediate treatment if bitten.
3. Foot access, for foot trims, inspections and washes.
4. Mouth inspections, teeth transition and oral health.
5. Eye inspections, ability to recognize & treat eye ailments.
6. Full body washes, skin care and removal of dead skin.



7. *Rectal access, delivery of large doses of antibiotics and other medications. Endoscope access can also be achieved through the rectum.
8. *Birthing assistance can be achieved in the ERD.
9. Stretch position & lie-down, back inspections and dead skin removal.
10. *Injection training.
11. Radiograph training, foot structure knowledge.
12. Urine collection training.
13. *Vulva & penis inspections & access. AI is also possible in the ERD.
14. Tusk washing in male elephants and tusk socket washing in females they have broken their tusk. Tusk trimming can also be achieved in PC.
15. Weighing of the elephant so pregnancies can be followed and so illness and weight loss can be detected.
16. Movement and exercise programs. A to B's in PC and the keeping of a daily exercise log are important.
17. Restraining behavior, in case restricted movement is necessary.
18. *Skin biopsies. Wound treatment.
19. Foot soaking if necessary.

* Rectal, vulva, penis & skin biopsy access will probably only be possible for PC handled elephants when there is an ERD, (Elephant Restraint Device) available. TB testing can now be achieved via blood samples.

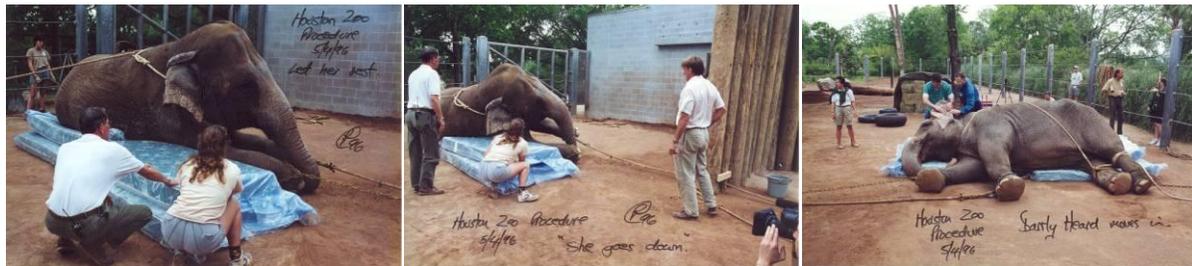


An ERD or “Elephant Restraint Device” is generally used when any minor invasive procedure must be performed, like injections, biopsies or wound treatment. The ERD should have moving sides that reduce space within the chute. This is so the elephant can be held briefly in a position so an invasive procedure can be performed. Standing sedation might also be performed in the ERD but any use of drugs should be closely monitored by a vet and the elephant’s recovery from the effects of the drug being used, will be the main focus.

There have been experiments in the USA with swinging chutes and with the use of straps you can lay the elephant flat on its side which provides access to the feet of elephants this is usually used with elephants that are not trained in PC or that can be assessed safely in Free Contact. These chutes took hold and some zoos invested hundreds of thousands of dollars to install the type of device when there was not much known about the strengths of PC training. For more intensive procedures like teeth removal this type of chute has some down sides and limitations, space around the head for equipment and personal narrows down options so fully fledged immobilization need more space.

The last options are standing sedation or total immobilization. The standing sedation can be performed in an ERD and would be used when only sensitive wound treatments, biopsies and possibly minor tusk procedures.

Immobilizations are the last of this elephant access journey. This type of procedure is a major undertaking and deserves complete planning because more elephants have succumbed under narcosis than any other human-elephant procedure. All elephants have not been made physically equal and you must evaluate, to the last item, every elephant's strengths and weaknesses before entering into an immobilization. Don't only plan on the elephant going down, plan on them getting up.



I hope these few words clarify what your access possibilities are with elephants in a PC environment. All options need a high degree of experience and planning.

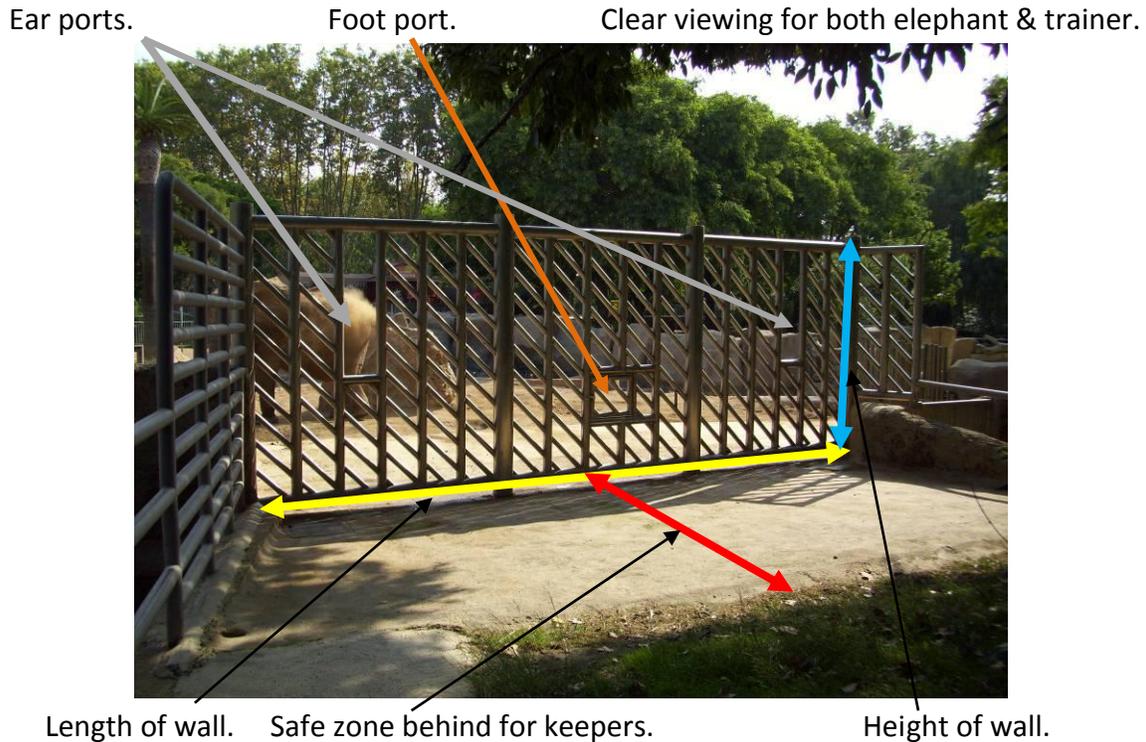
Definition of Protected Contact.

Written September 2008.

There are eight elements that when implemented define the results of Protected Contact with elephants.

1. Correct facility design orientated towards the safety and animal husbandry goals of the elephant program.
2. Safety if approached correctly will in itself define by correct facility design.
3. Clear behavioral goals, husbandry and medical that project elephant welfare.
4. Training techniques accompanied by written protocols that are focused on correct training methods and access for elephants.
5. Positioning and timing. The use of your body positioning and technique timing.
6. Keeper training.
7. Tools used to access the elephants, targets and rewards, etc.
8. Documentation. Clearly written as an institutional and industry guide.

Facility design orientated towards the goals of the elephant program.



The above PC wall is at the Barcelona Zoo and has been in operation for 1 ½ years the keepers learned at the same time as the wall was built and are demonstrating a high degree of skill and success working with the elephants.

Correct facility design, as defined by our elephant welfare standards and safety of the staff, while performing these standards is very important for timely implementation of the husbandry, welfare and medical behaviors. Injury and sickness of coarse should be addressed in a timely manner, so it goes without saying that safe reliable access becomes crucial and primary and no showboating behaviors take president over medical husbandry access.

Many modern zoological facilities implement an in-house version of protected contact based on three things, the elephant keepers understanding of PC, the facility design and constructional limitations already available in their zoo and what keepers and management have seen at other zoos. To cloud the issue further, elephant handling systems have been mixed on no one common philosophical line and even large well established institutions and corporations implement a mixture of systems where animals can reach and displace staff at will, calling it protected contact, some are still going in with the elephants in a free contact style, blurring the philosophical lines for the rest of the zoo world.



Most modern zoo managers don't know what a safe elephant handling system should look like and leave the establishment of sensitive institutional safety policy to the elephant team. Two zoos to my knowledge have guided their design process right from the start on PC training and thus incorporated concepts that allow for safe access and stationing. Dublin Zoo in Ireland and Chester Zoo in England have design elements, long walls, multiple access ports and large sand substrate areas where elephants can mixed, establish and reinforce herd hierarchal importance. No other true

definition of safe PC, to my knowledge, has ever been established where an institution seeking information could follow and successfully implement best practices for PC, where facility and program requirements and measurements that by design creates reliable and safe access and by definition and implementation enhance animal and human relationships. Go see these zoos when you can. Take stationing as a side note just for this with multiple elephants one needs space and specially designed walls for safe stationing access to implement fluid and reliable release and lockup routines. No



new elephant facility to my knowledge has ever been built with a clear PC definition as its fundamental guide. Of course elephant programs from the onset when PC training was established in the 80's have been left without a clear understanding and explanation as laid out here in this article and to my knowledge it is mostly left in the eyes of the zoo and its staff whether they have knowledge or experience or not, and still in many programs I have seen that are regularly practicing PC, the daily access to the elephants is extremely dangerous even to the point where the elephant could grab and or displace the trainer as it feels fit, one well known facility even lets its elephants stick their heads out into the staff areas.

The two types of elephants demand two different PC wall designs. Trunk versatility of Africans allows for the elephant to pass through relatively tight areas so wall design needs to be closely followed. Asian elephants are less flexible with their trunks so behavioral accessing space can be wider.

The wall design has to have clear visibility for both elephant and humans. One of the important aspects to the success of the training is that the elephant can see you at all times and see what you are doing. I like to recommend when building a wall from scratch that the metal being used be thin enough but strong, 10 cm square with 1 cm wall for the up rights is sufficient for most elephants, bulls might need to be up graded and one way of up grading is too fill the up rights with concrete and connections to standing facilities such as walls and other bars. The design details start from the middle of the wall where the foot port is located out to the sides where the ears port would be installed. Here again PC wall design has two different application for African and Asian elephants. Asian elephants historically and as they get older are prone to foot



abscesses and possibly need regular foot soaks, so we have designed access for both feet and mouth access into the front area. Foot ports, foot soak ports and mouth access opening are 70 cm wide all the way up. The foot port door height can be calculated at 1 meter. A foot soak tub can be passed through this opening and retrieved after soaking. The foot port should be 70 cm high up to the mouth inspection port. All ports need to either locked open or close depending on the application in progress. The mouth inspection port can be the same size of the foot port or as in the facility below the ear port is being used.



Rear feet access.

Front feet access.

Ear access, for blood samples.



Photos from Barcelona Zoo.



Eye access for medication.

The diagonals that are set at a 45 degree angle to the up rights and start at the bottom of the wall so if any space is left over it will be at the top not the bottom of the wall where the elephant can reach through at the keepers.

Mouth inspections.

Displacement of the keeper from the PC wall is a common occurrence in many institutions, operating in open spaces with only a couple of cross bars or up rights for protection is playing danger. With any PC wall no matter how it is built it can be dangerous, but what runs in unison with any wall design are protocols, things that one can and cannot do while at the wall. So, a keeper can be chased away from the poor designed wall if it is too open and the elephant can threaten of even hit or grab the keeper. To create the best protection and the best visibility, I have found, that the wall should have fewer big bars and even smaller bars, but without compromising strength.

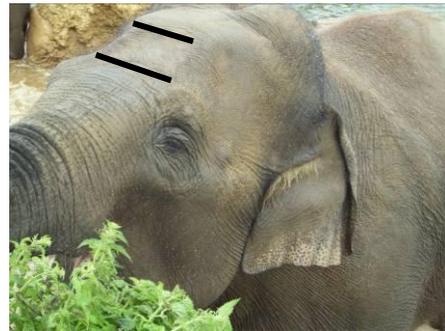


An ideal wall design after designing in the access ports with up rights every 40 cm and diagonal bars at 15 cm on center apart.

Always start the diagonals from the ground up so the space at the bottom is not too open to eliminate grab access, a short kicker off the first diagonal will assure no trunk access. The diagonal bars can also be long flat bar lengths on the elephant side of the wall which run the full length of the wall and only break where you have installed the access port. An elephant that can displace its caregiver at its own whim will chase the keeper as a game and even make it as part of the routine, taking away from the true reason for training, welfare access. The length of the wall is a vital aspect to the design and to the outcome and success of the program. Nine meters is an ideal length for the wall. PC training is not just training an elephant to lift its feet or present its ear, it should be a process that you use to communicate and form a bond with the elephant and a way, a means under-which you can develop a relationship with an animal. Nine meters allows you to move the elephant and create different circumstances that will build trust and behavioral understanding as you progress, it also allows you to position the elephant to suit the behavior you are looking to obtain. The very first thing that you teach an elephant is to follow you for food then after the animal is following reliably you introduce and touch the target with its head and for that it will receive a food reward. It is not just with any part of the head the area above the top of the trunk above the eyes where the trunk connects with skull.

See photo above.

One of the main reasons for insisting on this area of the head and no other is that the trunk is flexible and can stretch and reach unlike other areas of its body and the elephant will learn to touch the target without moving its feet. The elephant very soon finds it does not have to move to touch the target if you do not teach this from the beginning. By teaching the elephant and accepting only this area of the head you will be able to manipulate the elephant better with small steps and even be able to teach the elephant to lower its head in relatively short period.



Tools.

There are five visual elephant access tools used when training an elephant in PC. One the target, these training support tools have been widely used in many animal training situations. Two, food rewards are a selection of desirable food items that the elephant wants. There are some places in the US now trying to with-hold food as a motivator for training. It is my opinion that the elephant will work under training circumstances even if it is receiving its normal ration of food during the day and night and with-holding food can create tensions not desirable in, let's say, a breeding group, where tension are high enough without provoking it artificially. Three a food pouch for holding the rewards. Four is body language or you're positioning around the wall. Five is the wall design. The wall design is the crucial part of this equation. The wall must be designed so you have safe access to the elephant and built so the elephant cannot chase you away from the wall or even displace you as you



work. Once the elephant has figured out it can displace you, it will, and aggression might even increase. Many elephants in this types of situation become more aggressive or at least equally as aggressive because they can practice their game anytime they want if the wall is not built correctly. An aggressive elephant can be calmed down quite significantly and its aggressive tendencies reduced with a certain wall design. The wall must have four main components, a good length, a foot port, an ear port and good visually access for both animal and human.

In modern elephant habitats we are now installing PC walls inside and out so we can train the elephants at any time of the day and that the elephants do not have to be taken off exhibit or away from the group, we are trying to de-emphasize the houses as a place where the elephant must go for all procedures and pay more attention to the hierarchy and group dynamics when implementing care routines. If the wall is in an in-climate climate there should be a roof over the wall to protect keeper and animal from the rain.



Blair Drummond Safari Park PC wall.

Behavioral Goals, Husbandry and Medical.

This section will deal with what it is we can do at a wall and encourage you to divide your access program into three parts. The three parts are, what you can achieve at the PC wall through training, what you have to do in an ERC (Elephant Restraint Chute) knowing the elephant should stand completely still while you perform an aversive procedure and lastly standing sedation and a total immobilization procedure where the elephant is laid out for surgery. More information can be referenced in my article (PC, Chutes and Drugs, August 2008).

Safety.

I have seen so many definitions of safe PC with elephants. But I have also seen so many institutions where the elephants rule, developing at its own will, like a person in prison, the tone for the day. “Will I scare the keeper or will I not today”; the safety of the staff is solely in the hands, well, the trunk of the elephant. People are taken off elephants because it becomes too dangerous for that person to



Terra Natura Zoo, Spain.

work close with that elephant because of facility design has not established, philosophically and mostly bounces around without clear SAFE goals. Now we have scenarios where only certain people can work with certain elephants till the lower trainees have been at an institution long enough that the elephant doesn't chase or



Dublin Zoo, Ireland.

displace them anymore. This type of elite-ness a result of poor facility design is a severe hindrance to a successful elephant program and should be re-considered.

There are strong rules when the wall is built under my specifications and supervision. For one thing we have incorporated lines that are an indication of the zone you are entering and have entered. The two photos in this section highlight by way of lines on the ground operation zones. The photo to the left has a red line just barely seen in the bottom left half of the photo, there are two keepers present when in reach of an elephant, another procedural rule. In the other photo to the right, Dublin Zoo has chosen to use yellow lines because the lines are instantaneously recognized. The zone closest the elephant is the operation zone and if dialogue is needed the keepers are trained to step back into the discussion zone behind the lines where the elephant cannot reach. Reaching into the wall with any part of your body is prohibited, passing a target too far into the wall is also not recommended as elephants will grab or break a target if it should become an easy target, so to speak. Bad habits are hard to drop once established where the abnormal is normalized, so, all program training and evaluation should be orientated towards best practices, safety and animal welfare. The way I see this subject is, young people if trained correctly and the advice they are given help's them establish themselves as an asset to the industry, with a possible future of giving advice to other young people as their career matures, then the circle is complete.

Program Documentation.

Any professional elephant program should supply program support material. This material will clearly state the programs responsibilities and equally the importances and restrictions. The "Elephant Keeper Manual" should be the foundation of your elephant program, it should contain all relevant and pertinent institutional information that a new hire would need to know about his or her new career at your zoo on the elephant section. Please refer to my article called [PC, Chutes and Drugs](#) for a clear outline of which facility and training procedures can be used at which time, making your program safer and more efficient for staff and friendlier for the animals.

One Side Benefit.

Transportation Training.

One side benefit not often considered is PC role in crate training and elephant transportation. At the Copenhagen Zoo in March 2008 we successful moved a large mature Asian male using Protected Contact training; we also moved six other elephants during the same three-day period. Plaisak, Copenhagen Zoo's 50 year old breeding bull weighs around 6 ton he has long tusks and a nervous disposition, it would be no easy move under any circumstances. Plaisak's training started three years before when I was hired to establish PC training so the staff were able to trim his feet and take a blood sample. The team at



Copenhagen are top class animal keepers so training them to apply PC training techniques was easy. The date was set to move Plaisak and his stall companions from his old house where he had spent most, if not all of his life to the new Norman Foster elephant building in March 2008. Designing a new transport crate where we could practice PC was our first task. Such a crate had never been built before, to my knowledge, where target access ports and foot gates for restraining were built in the crate so a certain training approach already established in our daily training, could be implemented for the transport.

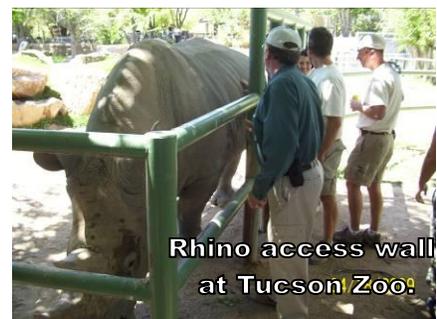


One of the first step was to train him to accept a bracelet at the PC wall inside and then accustom him to having it firstly removed in the crate and then after some time back at the wall where it was attached.

The photos above show the process in steps crate design in the first photo, target access in the second, foot access in the third and chaining in the four. The fourth photo was taken January 2008 so we had Plaisak ready to travel one month before we had to move him and this scenario we could practice every day so the procedure was clear to him and he was as stress free on the day of the move as we could possibly have him, only the crate leaving the ground could not be simulated. Other husbandry combinations we have been using for some years now in conjunction with safe PC are twenty-four hour access, under safe circumstances of course. Elephant are in part nocturnal spending much time foraging and moving so this time outside is valuable to the over health of the elephant. Elephants will sleep outside on prepared sand piles and in mixed herds young elephants are tied in the morning after moving and playing all night. It has a positive dramatic effect on their feet also.

PC Training of Rhinos & Giraffe.

This is a short section about two other animals that I am now becoming involved in, in some of the zoos where I work. Husbandry and medical training of Giraffe and Rhinos is trying to become established in our zoos and although we have been in part training Giraffe in chutes and Rhinos also there never seems to be exact information facility measurements, gate sizes and training techniques that



people can harvest that gets them started on a way of clear information and philosophies that will expedite the process, in other words everyone is doing it differently. Till now with elephants we have been all over the place throwing good money after bad instead of deciding what it we want in a facility, what access behaviors we need and then building the facility to suit our requirements. Rhinos seem to have a lot of problems with their feet and safe access to all four feet would be good, plus blood sampling and probably rectal access for reproductive analysis these seem to be the priorities. Giraffe are the same although I don't think reproductive analysis is on the list but certainly hoof trimming and blood sampling so specific facility design tailored to the husbandry and medical access needs where behavioral preparation can achieve is essential.

Conclusion.

Trying to create program harmony is my goal, where a person from one institution could go transfer either on a job swoop or for further education to another facility and work with the elephants with no intense training or long orientation. I feel we have achieved this goal with PC training in some zoos already. A person from one culture/country can operate, understand and be understood from the get go and they can work with clear program goals, using simple and safe training techniques under effective facility design. The elephant is the benefactor from this type of situation, and after all, that's why we do what we do.

Gravity and hydrotherapy procedures as a way to reduce the possibility of stiffening joints after an accident in elephants.

Written August 2006.

With a section by Gina Nichols, Elephant Manager, Santa Barbara Zoo, California.

Elephants are not too prone to accidents in our although on occasions it has happened, under historic circumstances, in old style facilities moats were concerned and elephants have fallen pushed in. Zoo elephants are generally out of muscle pulls can also happen. The size of an body demands that for long percentages of time have all four legs under it's weight. Structurally



zoos particularly where or been condition so elephants they must specking, an

elephant's leg is like the legs of a table. To carry the weight all four legs must be 90 degrees under the weight, see photo right. Now, take one leg off the table or incapacitate one leg of the elephant, the elephant will deteriorate and likewise the table falls over. To highlight how sensitive an elephants stance and gait can be I'll use the following example. *Chaining elephants over night, which we did on a regular basis in the past, exposed elephants to many abnormalities in their physical and behavioural development. The next generation of captive born elephants will be our true test as animal managers, if they are still rocking in anticipation*

or boredom, banging their heads against walls, waiting at doors to be let inside and pulling their mammary glands, we failed.

One elephant I remember quite well arrived from an Asian zoo to a zoo in the west. The culture the elephant arrived from had had a long practise of tethering elephants mostly because the mahouts the zoo had hired had a very strong philosophy concerning elephant handling and tethering at times when the elephants was not working. The elephant arrived in the west with a compromised front leg that appeared to be longer than the other one. As a youngster at the zoo the elephant was chained for very long periods, a practise the culture condoned without question, but please remember not out of malice. The elephant had developed, not surprising, a stereotypical behaviour because of the way and length of time it was tied. The elephant I understand, would rock back and forth pulling on the leg that was tied, which is always the same leg in the culture of the mahouts. The leg over time stretched and became longer, unnoticed by the caretakers even the zoo management didn't notice. Unfortunately the leg became chronic and the elephant developed a life threatening compromised leg.



To the left is a photo of a healthy elephant leg.

See the relaxed bend in the joints and see how the elephant places the foot flat on the tub. This is a very good guide when evaluating a compromised elephant leg.

It as been my experience, and I wanted to share that with you, that you can help elephants mend after non major accidents to the legs, wrists and knees.

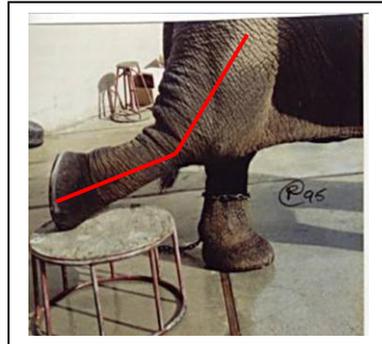
Naturally your Veterinary Officer must be contacted when such accidents happen, an elephant slips or is hurt during a confrontation with another elephant. Pulling muscles in zoo elephants can be easy because they are generally out of shape and over weight. An elephant's first response when its hurts it's leg is to stiffen the joint to protect it and distribute it's body weight evenly. Depending on the severity of the accident an elephant will limp around for month's not wanting to bend the leg. I have even witnessed elephants after a long period of limping forgetting that the leg is supposed to be hurting and in a fit of excitement run bending the leg normally then as if to say wait a minute my leg is hurting and stiffen it up again. This is proof to me that they will keep a leg stiff long after the pain goes away and I believe then it becomes a habit they can't kick and in time the tendons shrink and after a long while they can not bend the leg anymore. This is why it is important to me that I bend the leg right after the accident and this can be done in Free or Protected Contact elephant handling. I call this procedure "Gravity Therapy" only because it is gravity that finally makes the leg bend and the hydro-portion of the procedure relaxes the muscles and tendons so the weight of the leg when relaxed, bends. This can be done with a rear leg or a front leg, elephants will stiffen both front and rear legs in an effort to stabilize and control their weight.

There are a number of topic solutions that can be used but please before using anything consult your vet department. "Spirit of Camphor" is one that I have used in a liniment capacity on the legs of elephant, solutions can be found that are used on horses but for elephants they are used in greater quantities. DMSO solution has been used when elephants are stiff in their joints with some success. If the leg is really sore painkillers can be used to over ride the initial pain that might stop the elephant wanting to lift its leg for the therapy. This again should be in the hands of a vet and their team, which drugs for how long etc, is a professional decision.

I would like to share with you four cases of stiffening in the joints and the therapy that was offered to help and cure the elephants concerned.

Case 1. Peaches a female African elephant housed at the (SWAP) San Diego Wild Animal Park, California, USA.

Peaches had been knocked into the moat in the yard, fortunately the moats at the time had a gradual the elephant side so her fall was more of a slide and damage was avoided. Peaches was not an agile her build was rather round on all corners, but big to she struck an impressive pose, even more so when stood next to her. After getting out of the moat, was a procedure in itself, she started to limp on her leg. She pretty soon held the leg completely stiff, it as she walked. This to me is the danger zone for elephants that have hurt their leg joints over time the tendons shorten and the leg seems to lock in the stiff position and something should be done right away, usually it is only pain relief and no more because the consequences are not as apparent to everyone, its only after you have seen a number of cases when you can start to join the dots and the picture starts to mature.



outside slope on greater animal, boot, you which left rear swinging

Case 2. Cookie a female Asian elephant also housed at the (SWAP) San Diego Wild Animal Park, California, USA.

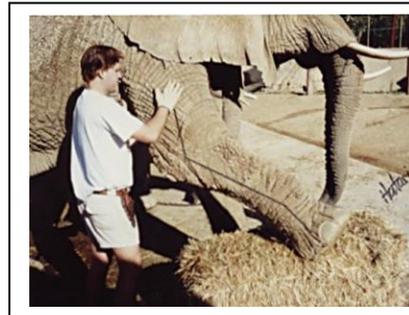
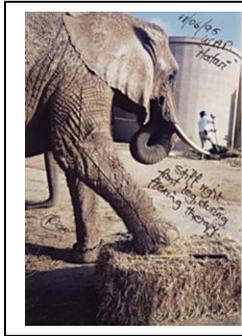
Cookie an over weight elephant was earlier in her career a ride elephant at the SWAP and spent a lot of time walking. When elephant rides came into question they were discontinued. Standing much of the time on concrete floors particularly at night many zoo elephants become out of condition and loose muscle tone. Cookie was in Protected Contact when the therapy was performed on her. Her years in FC and the cues and commands she already knew help with the procedure.



We never did know what had happened to Cookie, some though she had slipped but there was also a good chance it could have been the onset of gout from the very high quality diet she was receiving and all the treats she would get as part of the PC training system that was being implemented, even arthritis was mentioned. We did develop a special piece of apparatus that allowed her leg to be elevated in increments, see photo above. Lifting her leg gradually higher till it was at a 90% angle, the apparatus we designed and used could be higher and lowered depending upon the stage the

animal was at in the therapy. Cookie eventually walked normally after a few weeks of the therapy.

Case 3. Hatari, a female African elephant at the (SWAP) San Diego Wild Animal Park, California, USA.



Hatari for those who did not know was one of the little elephants in the film after her name; she played alongside the “Duke”, John Wayne. Hatari had for as long as I knew her always had a compromised front left wrist so any other issue with her legs would have hit her very hard and disabled her more. The story behind Hatari’s front right leg problem grew out of a mistake and a misunderstanding of elephant management team at the time. Too many non-cooks professing to be cooks in the kitchen. She was restrained in the yard during reconstruction of the barn and the male was released out of his house before she was taken off restraints, consequently she pulled her leg rather hard trying to get away from the male not knowing there was a fence between them. She started to limp almost immediately I understand, so therapy was suggested and the keepers started right away. Because the leg was very stiff she was started on a flat bale of hay, Photo 1 above. After the initial therapy the bale was turned on its end, photo 2. Eventually graduating up to an elephant foot work tub, photo 3, where over time she regained some of the motion of the leg. I have drawn lines on the photos along the leg so you can see what the initial bending ratio was and how it improved as the treatment advanced. In Photo 3 with the leg higher on the tub you can clearly see the potential of Gravity Therapy as the knee joint bending ratio increases. The leg will gradually start to relax and bend through its own weight, stretching the tendons and muscles. Add warm water, pain relief medication and (Spirit of Camphor) to the stretching, then you have a very strong chance of salvaging the leg and joint. The use of a strong fire hose jet and pressure washers on the leg can also be important to induce blood flow particularly if you have warm water available. The fire hose can also act like a deep muscle massage and I imagine it should feel good also. The therapy will give the elephant confidence to bend the leg and eventually walk normally again. If of coarse the leg is not severely damaged.

Case 4. Suzie a female Asian elephant housed at the San Barbara Zoo in California.

Suzie has had previous history with stiffness and injury on her LF leg. We had previously treated her w/ibuprofen when she had bouts of stiffness on her wrist. When she received the damage from her recent accident in the yard, her whole leg swung out sideways when she

walked and she had no flexion in her wrist. We started hot water hydrotherapy (round rotations for a period of time over the affected areas-and the other areas/joints that she was applying more pressure to/due to her injury) and worked her through targeting her leg up on the foot bar. She first had to step back and swing her leg up awkwardly. With several repetitions of this she started to place it up with slight flexion. At that point I started to apply pressure to the front

of the foot and originally had my right hand slightly back to place pressure behind the wrist joint area and left hand up a few inches above the #3 nail.

While apply pressure to both areas she flexed her foot in better position. With multiple repetitions she was eventually moved more fluently (after the first couple of days, pressure was only applied to the front of the foot). We then applied hot/warm water therapy to the same area and applied DMSO to the affected area. She moved better throughout the day after each session. Within a few days she

was able to get a 90-degree bend during therapy and had a significant difference from her walk into the barn/and leaving after the session. It only took a couple of weeks to get her back to a near normal gait. We did increase her ibuprofen during this time and reduced it accordingly to her movement. She re-injured herself and by doing the same therapy routine she was back to normal in a couple of days. It's been a couple of months and she has not had any other problems with her joint area. *Extra sand was placed in the yard when the first injury happened to allow easier resting access. She continued to lie down at night. Initially her time was greatly decreased, but through the process we noticed it easier for her to lie down and she lay down for longer periods. Initially she lay down only on one side, but she was able to lay down on both sides after the whole process.



Benefits of the Therapy.

Before any of these treatments or suggestion is implemented please contact your Veterinary Department or consulting Zoo Veterinarian.

The benefits of the application of this therapy will be obvious, if an elephant that was limping or dragging a leg from a minor injury or joint strain starts to walk normally and can put normal weight back on the leg, then it is working. Other benefits that I see are in the cases of, and at the possible on set of arthritis, particularly in the wrist and knee joints.

As we all know from human medicine movement is of great benefit and helps manage arthritis. Arthritis as we also know was and still is a huge problem in older captive elephants.

A side note: Zoos that perform regular exercise with their elephants are probably ahead of the game. Elephants that walk and climb over different terrain, have access to varying topography, either in their exhibit or on their daily walk, swim on a regular basis, - you get the point, are

generally more active and I believe, are less likely to develop joint issues unless from injury of course.

Therapy will not help in cases of confirmed abnormalities and deformation to legs and knee joints that can occur through the lack of exercise, or when an elephant is carrying excessive weight and as I see sometimes in older elephants the shifting of joints centre of gravity and is promoting an abnormal gait from what appears to be bone deterioration. In my opinion it is too late to introduce health enhancements, even medication does not help in extreme cases. Maybe strong painkillers will help ease the discomfort, but the dye has been cast for those animals.

There are two zoos I would like to point out that in their normal daily routines offer their elephants routine cardiovascular exercise and challenges on their daily walks.



Albuquerque Biological Park exercises their elephants in protected contact with a series leg lifting behaviours front and rear and is documenting many muscle toning benefits from the exercise sequences.



over, at times, very hilly terrain I born at the zoo climb over negotiating myself.

The Jerusalem Zoo in Israel takes their elephants on forging trip in and on the outskirts of the zoo. Moving watched the young elephant obstacles that I had difficulty

Special thanks to Gina Nichols Elephant Manager, Santa Barbara Zoo, California, USA for her contribution to this article.

AN IMMOBILIZATION PROCEDURE IN ELEPHANTS.

Written August 1996.

Too many elephants have died during procedural immobilizations. Many factors have been to blame why an elephant is lost during a procedure. Debilitated or out of condition elephants, too weak to stand, wrong site selection, where the medical staff have no room to operate and inadequate equipment preparation, equipment available that would ensure the safe lying down and a quick and effective recovery of the elephant after the procedure and lastly the lack of knowledge, people who had never lied an elephant down and maybe got lucky with a successful procedure them assume the procedure they followed will work again. These are all situations that expose elephants to risk.

Many injurious things can happen to an elephant if it is not lie down in a controlled manner. A lot of elephants, unfortunately, are just allowed to fall over like many other animals. In some larger zoos, zoos that perform multiple immobilization procedures in a year sometimes development immobilization protocols these situations become the foundation of knowledge. For Giraffes and other large delicate animals immobilization protocols come in written form, but very rarely are elephant immobilization procedures documented.

If an elephant falls into a compromising position in a stall or yard or even into a moat during a procedure valuable time is wasted recovering & repositioning the sleeping animal and sometimes the elephant has died before the medical procedure is implemented.

Pre-immobilization observation and preparations are imperative to a successful procedure.

The following is a pictorial account of how an elephant can be lie down and recovered safely.

Possible Reasons for an Elephant Immobilization.

- Medical issues.
- Tusk work not possible with elephant conscious.
- Foot-care not possible with elephant conscious.

Health & Age of the Elephant being immobilized.

It is extremely important to perform a pre-immobilization elephant status evaluation. This means that an elephant health profile be performed on each elephant undergoing an immobilization. Old and out of condition animals are generally have a lack of muscle mass particularly in the neck and shoulders areas of the body important this is a result of constant standing, not lifting their heads or using their necks. Trunk paralysis is usually found in Asian elephant will also be a huge obstacle for a recovering recumbent elephant. The swinging of the head and the top rear leg as the elephant tries to stand can be the difference between a successful procedure or not and the more dead weight the elephant is carrying ie, its head because it is not supported by strong neck muscles or its trunk because it is paralyzed and useless the less chance the elephant as of recovering by itself.

Site Selection.

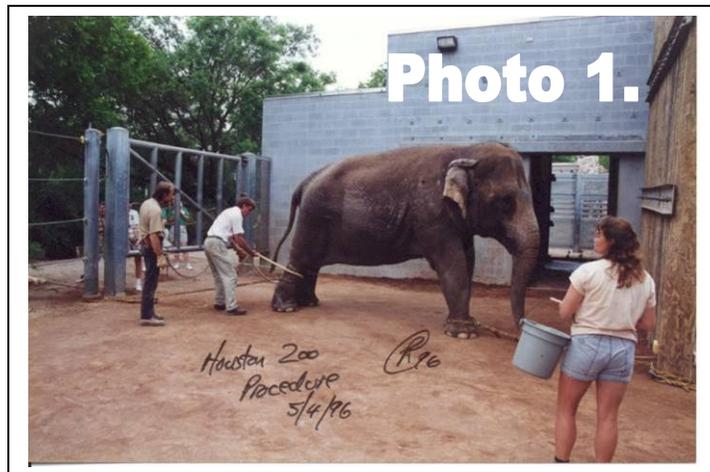
Inside or out. The weather, for the most part, will determine where the procedure is performed. Although, if there is not sufficient space in the only area available, a decision should be made to alter the physical plan of the facility or even build an area that would be suitable for an elephant immobilization. If the area is not suitable and the procedure can be delayed, it would be a good idea to postpone it to a later more suitable date.

Equipment Selection.

- Ropes of various material & lengths.
- Leg chains.
- 4-twin size Mattresses.
- Crane and lifting straps for lifting elephant.
- One Three-ply 1" block and tackle.
- See a more detailed list at the end of the article.

History of elephant in photo.

This procedure was performed on a female Asian elephant with teeth problems at the Houston Zoo in 1996. The elephant was handled under a Protected Contact system of management. In preparation for the procedure the elephant was trained to accept four leg chains through a PC wall and be walked to a predetermined area of the facility where the procedure was performed.



Leaving the PC wall after all the legs have restraints are attached, the elephant will already have chains on its front right and rear right legs. These restraints will be the leg attachments that the elephant will be firmly secured by once in position. As you can also see in [Photo 1](#), the elephant is restrained slightly off center, meaning, all four legs are not 90 degrees under the body in a normal standing position, but slightly spread apart, off balance. This position will give you an advantage later when the elephant is going under, during the anesthesia. On each of the left feet there will a rope attachment. Ropes should used on the side of the elephant which will be the up side once the elephant is in the lying position and will be released once the elephant is in the half right position, so the elephant can attain the fetal position with the up side legs. This is also the position that will put the least stress on the elephant's legs, once down. After positioning the elephant the first thing that is done is to attach a figure of eight 1" "cotton

rope" around both back legs. Both back legs will be secured together, this reduces the amount of movement the elephant has during the anesthesia

Photo 2.



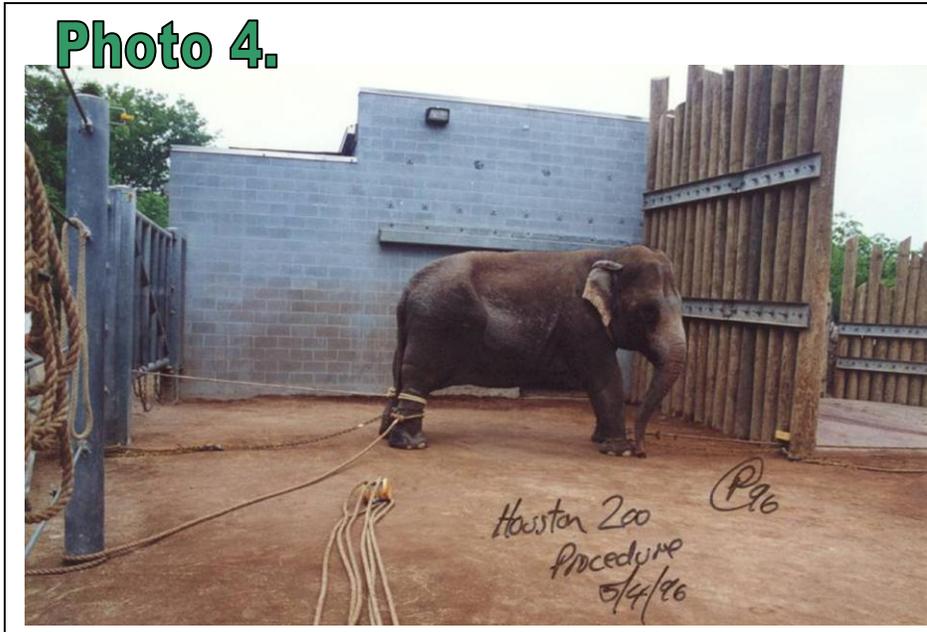
Step two after the figure eight rope has been secured, is the placement of the side restraint "1" manila or nylon rope". Sizes and

lengths for all the ropes will listed at the end of the article. The Side restraint rope should attached to the chain side rear leg. Attach the rope below the chain and below the figure eight rope. Leave the side restraint rope off to the side after you have you attached it; it will be secured once the neck rope has been applied.

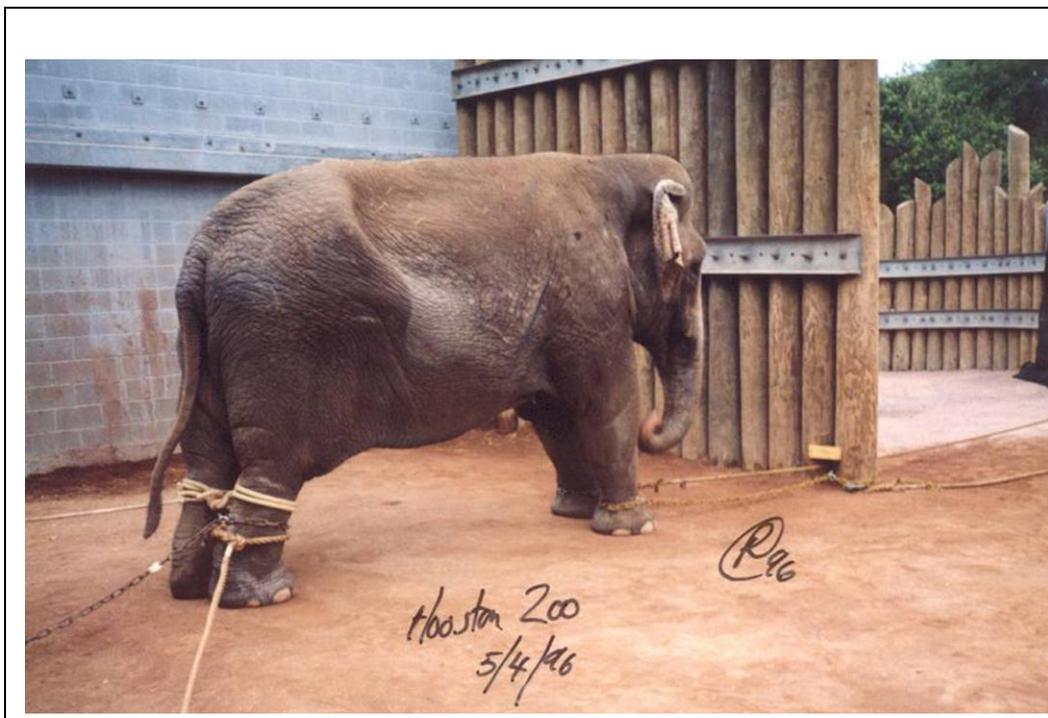
Photo 3.



In Photo 3 the Vet gives the immobilization injection after the figure eight and side restraint ropes have been attached. The elephant is reassured, the tail is held so it doesn't hinder the procedure. At the same time the elephant is rewarded for compliance.



In Photos 4 & 5 the elephant is allowed to stand while the anesthesia takes effect. These photos also show rope placement and body position of the elephant during preparation.



The left front and rear leg ropes, blue arrows, are tied off to bars or other facility attachments so the legs can be quickly released as the elephant attains the fetal position while lying down.

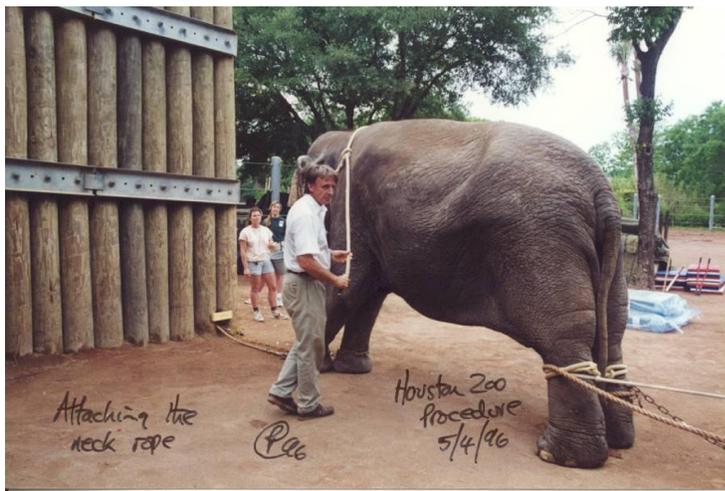
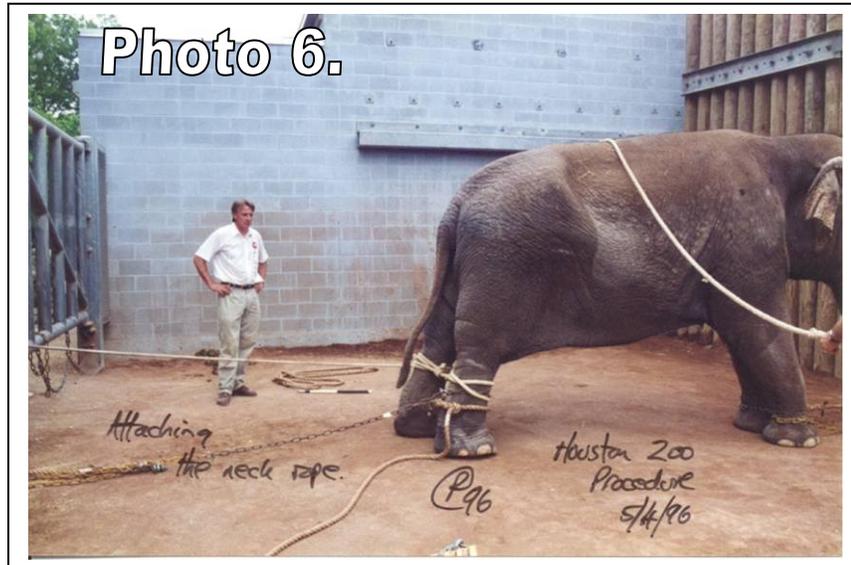
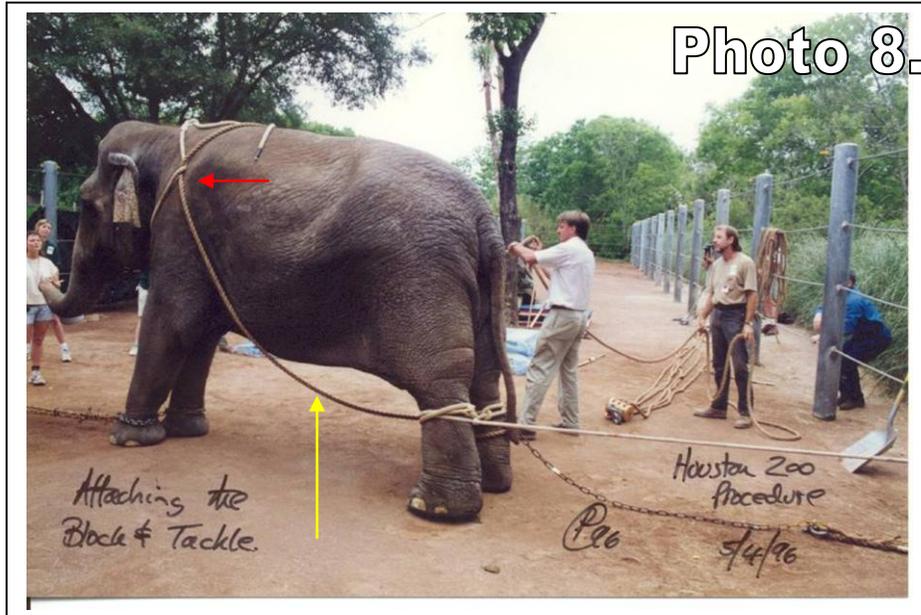


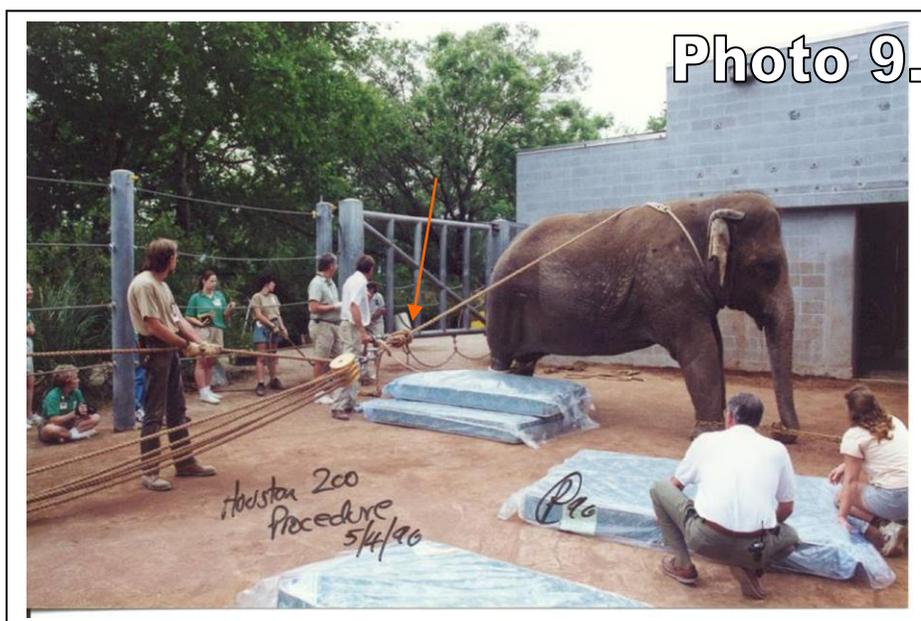
Photo 7.

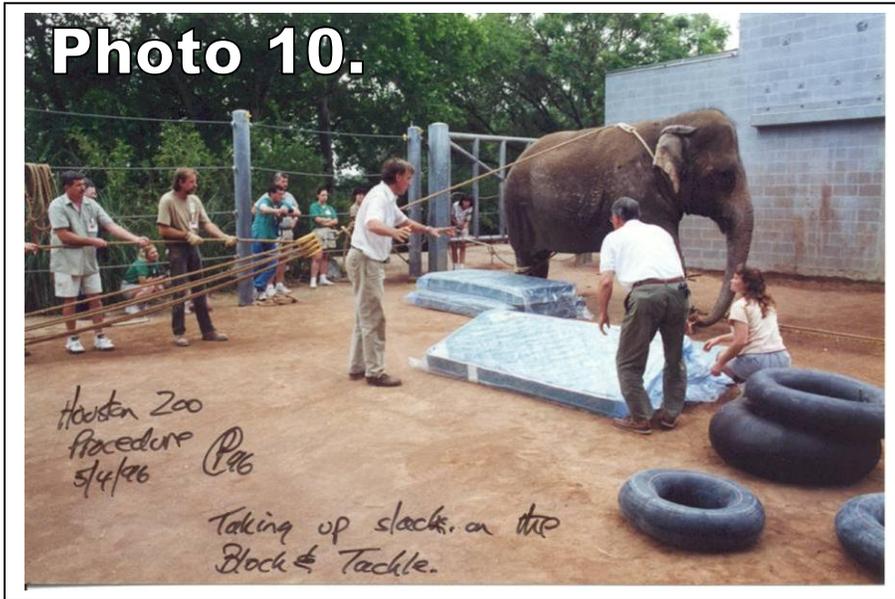
Neck rope placement is the next equipment addition, but can only be attached when the elephant is sufficiently under the anesthesia. From this point, and with some elephants, the procedure can go relatively fast. Three good behavioral observational guides at the point will be, if the elephant is not responding to food rewards, the ears will fall

forward as if the elephant does not have control over them and the trunk will curl on the ground in front of the elephant. All precautions should be taken at this point when moving around the elephant, in some cases elephants will fall sideways, suddenly without warning. The "1" cotton neck rope" can be placed by two people; each person holding an end the, rope can be walked over the body of the elephant till it is over the neck. The person holding the loop-spliced end of the rope can swing there end under the elephant's head to be caught by the second person, at this point the person in control of the rope will complete a knot and tie the ends of the rope so it hangs around the elephants neck. The neck rope must be tied in such a way that it will go no further than the shoulders of the elephant when under strain from the side restraint rope, which is the next rope to be attached.



The side restraint rope is a “1” manila or nylon rope” approximately 60 foot long which is the rope, as the elephant falls into sedation, the means under which the elephant is slowly coaxed onto its side. The side restraint rope is passed under the elephant’s belly, yellow arrow, and passed through the neck rope, see red arrow. In the case of this procedure the restraint rope is attached and coming from the elephant’s left rear leg. The restraint rope is thrown over the elephants back and a loop is tied in the restraint rope about 15’ from the elephant, to accommodate the three-ply 1” block and tackle, demonstrated in photo 9 and indicated by the orange arrow. Mattresses are brought in at this point also in readiness for the elephant to go down.





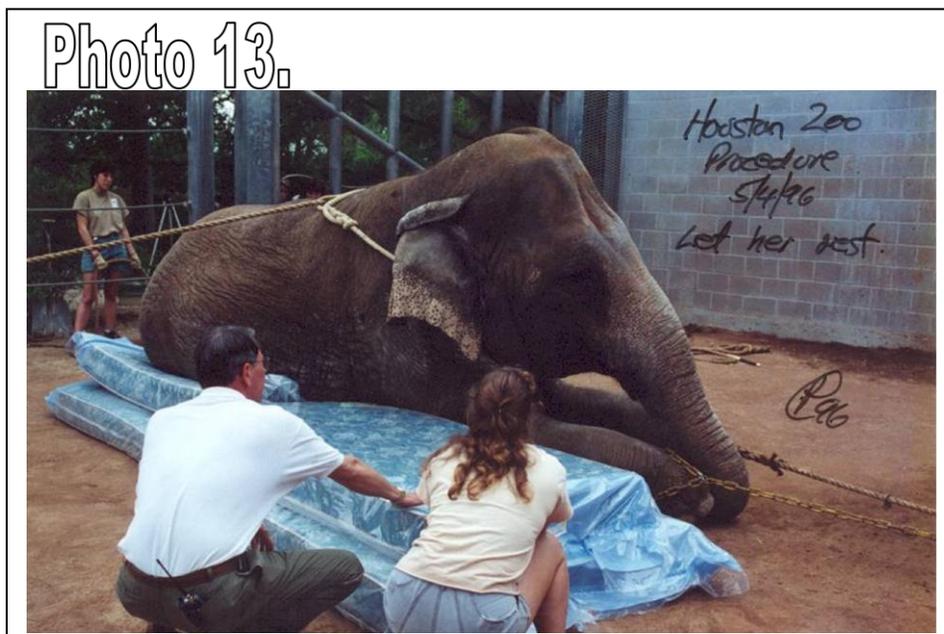
Mattresses placement will be critical to the success of the procedure and the health of the elephant because the whole point of controlling the elephant's movements is so you can make the procedure as safe and comfortable for the elephant as possible during the sedation and equally as important, the recovery. Four single bed mattresses are needed to give sufficient cushion under the hips and the head while it is down. As the elephant goes under the sedation it will attain certain body positions that will give clear indication of its status. Elephants generally have a tendency under sedation to fall back on their back legs, and have in some cases, when they have not been under equipment controlled, fallen over backwards in very precarious and dangerous circumstances.



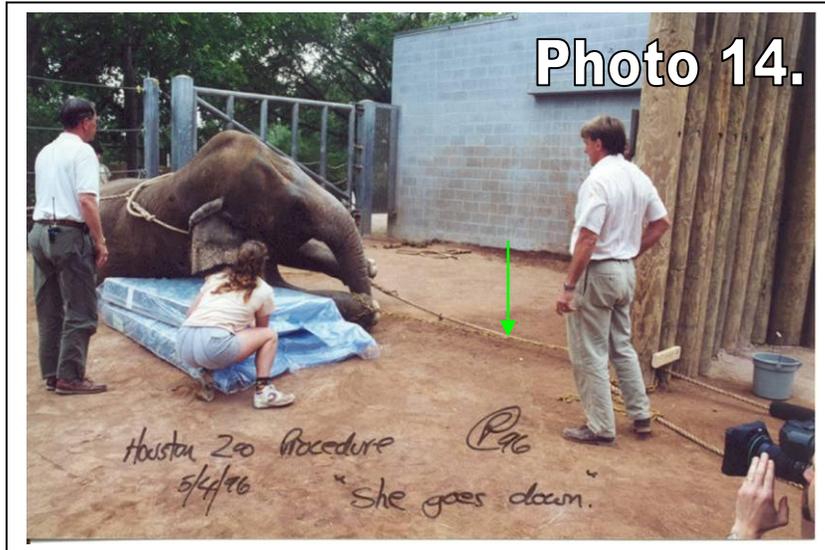
In Photo 11 you can see the tendency of the elephant to rock backwards. At this point all slack on the block and tackle should be taken up, and continued. As the elephant feels the pressure of the rope on its back it will also have a tendency to move away from the rope; so it is imperative all slack be taken up. This gentle pressure is the mechanism under which the elephant is coaxed down.



The elephant assumes the half right position as it gently falls under the sedation. The tire inner tubes, in fore ground, were for elevating the head, if need be, so water would run out of the mouth during the tooth extraction procedure and not down the throat and possibly into the lungs. In this case the mattresses were sufficient.



The elephant is allowed to sit for as long as it takes in the half right position, Photo 13, till it lies down completely, of its own accord. Its also important to have a person that elephant is familiar with at its side during the whole procedure. This person would also offer rewards during the procedure to reassure and monitor the elephant's coherency and state of mind. This person is the lady in the blue shorts. Slowly the off side front left leg rope, green arrow, is released so the elephant can attain a comfortable lying position.



The elephant slowly lies down completely of its own free will; the front left leg rope, green arrow, is released so her leg will fold by her side. The rear left leg rope is also released at the same time.



The pressure on the block and tackle, purple arrow is continued till the Vet staff says that the elephant is under the anaesthesia completely. The elephant has attained a good head elevation, green line, so the inner tubes will not be needed.

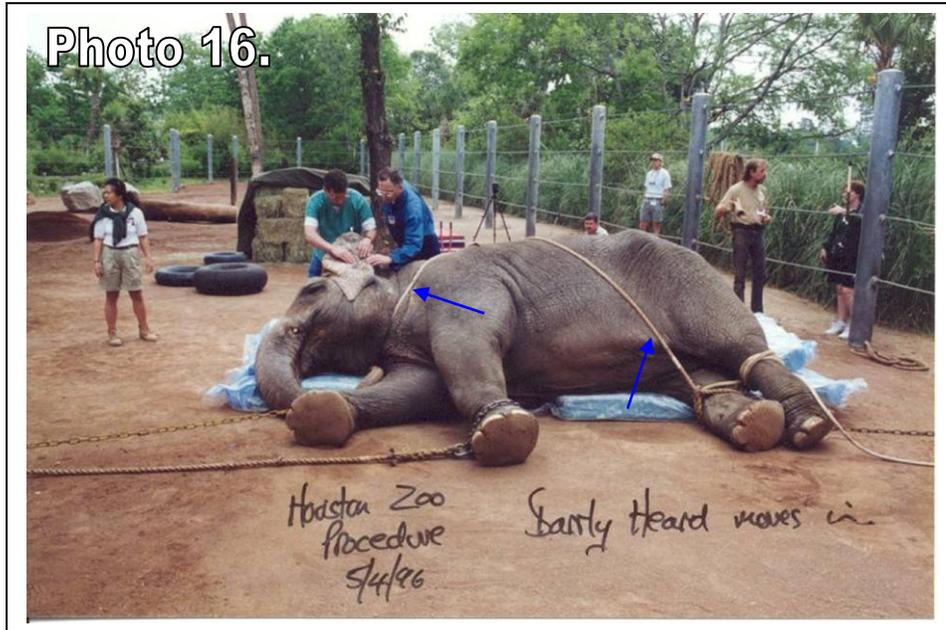
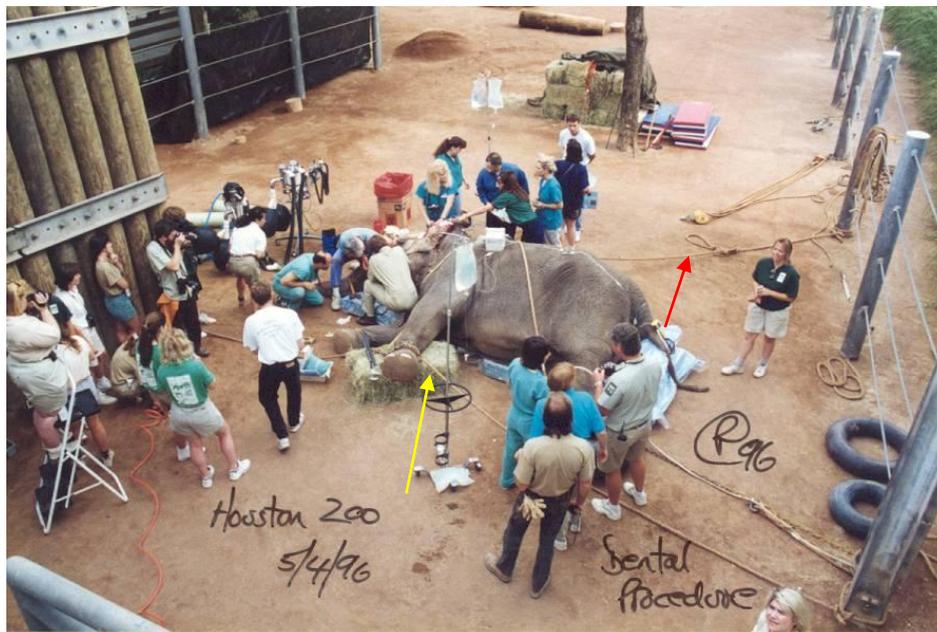


Photo 16, the Vets and surgeons move in to secure a pulse. Both left legs are free and the ropes are slack. The side restraint rope and the neck ropes, blue arrows, are still under slight pressure, in case the elephant should become light under the anesthesia and try to get up.



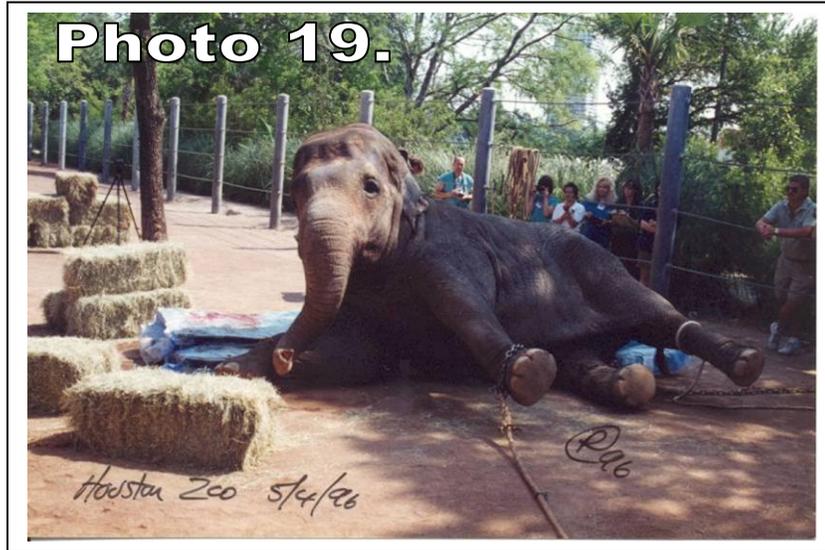
Before the surgical team work actually starts to work on the elephant ropes need to be loosened and some ropes need to be added. For instance, the yellow arrow indicates a leg rope on the front left leg that adds more security of the doctors. It will stop the leg swinging forward if the elephant should become light while under anesthesia. Also the side restraint rope is tied off to the a fence post, red arrow, but still attached to the neck rope so again if the elephant becomes light under the drug it can not go passed this rope. One other very important item I must inject at this point is to move the down side legs during the procedure. During long procedures the down side limbs will receive reduced blood flow and could possibly become stagnant and life-less. Attached a come-along to the rope on each leg down side leg and move them about a foot in both direction this will allow blood flow to the areas of the limbs that are touching the ground.

Recovery.

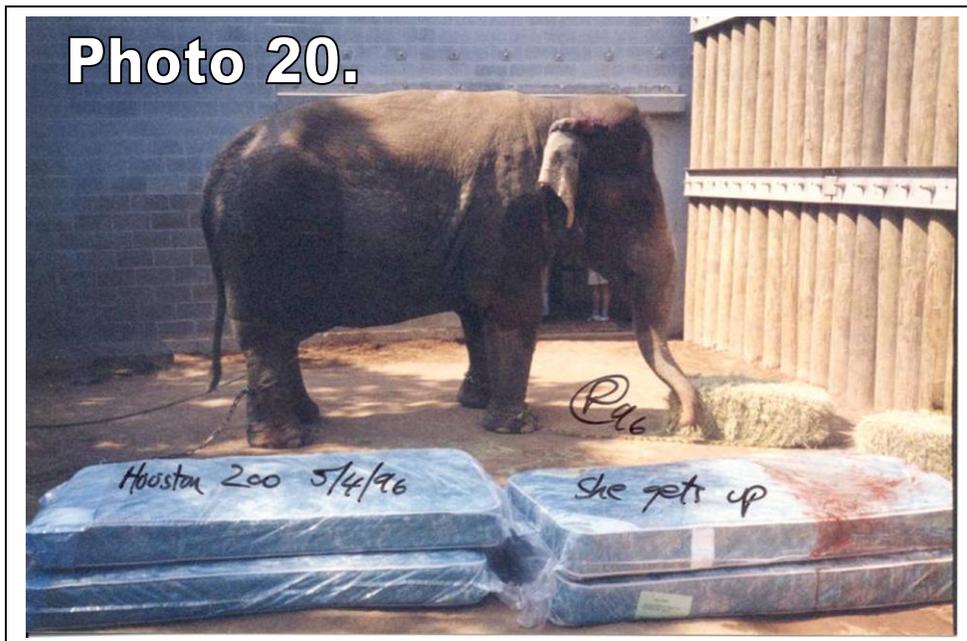
Before the elephant is reversed it should be determined where the elephant will spend the rest of the day, and night. It has been my experience that some elephants will show the effects of an immobilization for hours after the procedure so as a general rule it is important to offer the elephant, depending on your climate, warmth, cool, shade, water and a light snack while under observation. Some elephants have re-sedated after the initial procedure.



The leg restraints that were attached while bringing her into the selected procedure area were reattached. All other restraints were checked and secured.



The crane during the procedure was kept at a reasonable distance from the procedure site but could at a moment's notice, be brought in if need. In the case of trained elephants and elephants in good physical condition a crane might not be deemed necessary at first thought, however, all elephants act differently under drugs and it should be taken into account that an elephant that lies down in a routine situation could forget after a drug experience, and might need some help.



The elephant stands up and is ready to be moved to the area where it will spend the rest of the day recovering.

This procedure and set up may appear to be a huge time consuming and laborious, because many elephants fall over in the right position, I would consider that just luck. Protecting your asset throughout this whole process is important and is no different than giving fresh water and clean food. After you have witnessed this way of laying down an elephant and understand the sequences involved, no other method will be considered safe.

Equipment sizes and lengths.

- One 1" x 12-foot cotton neck rope with a loop splice at one end.
- One 1" x 60 foot manila or nylon side restraint rope with a loop splice at one end.
- One three ply x 1" manila rope block & tackle with extremely long ropes. The block & tackle should be fitted so it reaches the predetermined distance from the elephant to the selected fence with sufficient trailing so a good number of people can hold it when the slack is taken up and pressure is applied.
- Two 3/8" x whatever the distance is from the elephant to the fence floor ring etc, harden steel chain and attached to the elephant with a shackle not a fast release.
- One short 3/8" x the distance around the elephant's leg plus 10" chain for the quick release leg rope so the elephant can attain the fetal position easily when going down.
- One 1" x 40 foot manila rope with a loop spliced at the end that attaches to the short leg chain for quick release.
- Six 3/8" and one 1/2" shackle for the ropes and chain leg attachments.
- One 1" x 30 foot cotton rope for the rear left leg with a small loop spliced in one end.
- Two 1 foot wide lifting straps approximately 15 foot long for use by the crane if the elephant as to be lifted.
- Twenty bales of hay in the event the elephant must be supported from the sides or under the belly while encouraging it to regain it's feet.
- Four single bed mattresses.
- Toolbox with, but not limited to, a hammer, pliers, crescent wrench, bolt cutters and other necessary tools.

Some of the equipment sizes mentioned in the document may differ depending upon the facility dimensions and distances you have to work with, in any event a pre-procedure checklist should be compiled before the procedure is attempted and a walk through and a debriefing with all of the staff that might be present during the procedure is recommended the day before.

The day of the procedure a Vet debriefing is also advisable, which will develop a, "Who's doing what list" medically during the procedure.



This method of rigging an elephant with ropes is also the method used in some institutions when casting or teaching a young elephant to lie down.



This article is not meant to be a how to document and should only be attempted if a person versed in this method of elephant immobilization and correct rope is present during the pre-procedure and briefing of the actual procedure.