

# **Fingertip Regeneration**

## **Integrating Stem Cell Activation Therapy Into Fingertip Regenerative Medicine**

by

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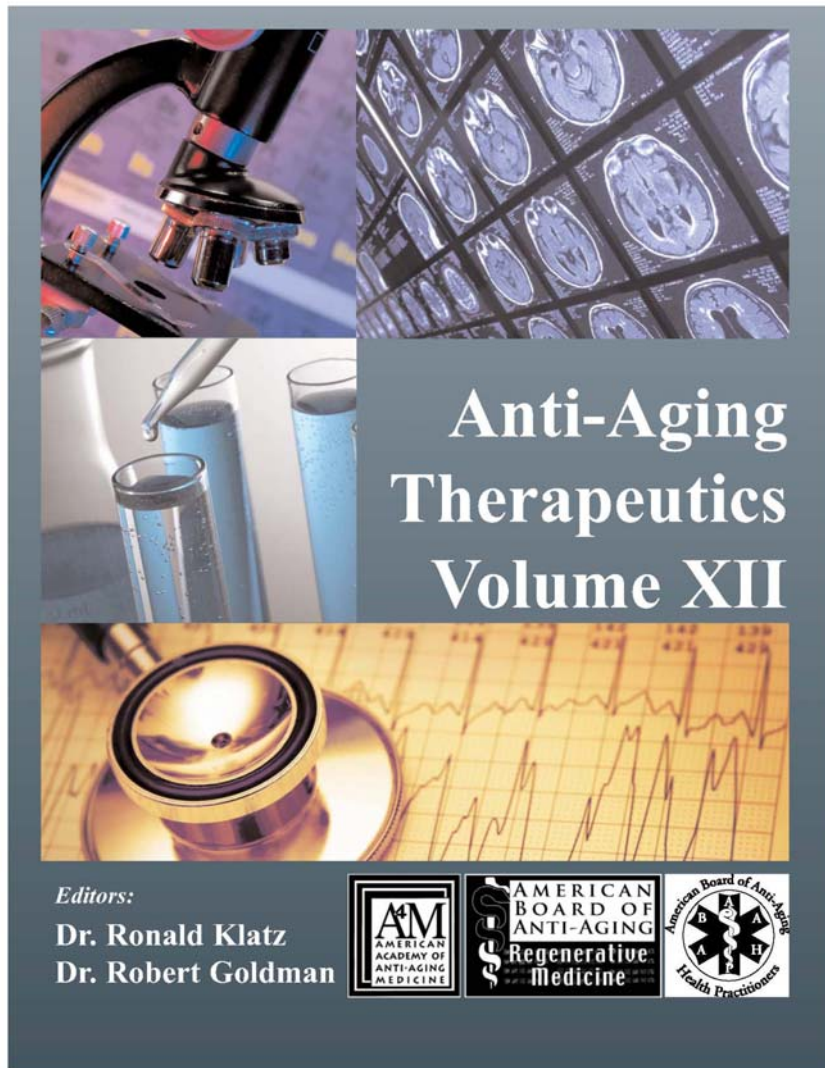
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## **Fingertip Regeneration Stem Cell Activation Therapy**

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### **Integrating Stem Cell Activation Therapy Into Fingertip Regenerative Medicine**

#### **Abstract**

One of the most common childhood accidents is injury to a fingertip. The standard surgical procedure is to either suture a skin flap or if the fingertip has been retrieved, to try to attach it and hope for the best. Many times microsurgery is resorted to, to ensure the success and full functionality of the finger. However, in many cases this fails and the digit eventually just falls off. Those that do succeed, however, end up with either a shorter finger, a deformed / missing nail or with a sensory loss of touch.

Fingertip regeneration is a true composite tissue regeneration involving regeneration of bone, cartilage, tendon, blood vessels, skin, nail, cuticle, fingerprint, and half a dozen of specialized sensory nerve endings.

Of great interest are case studies of children and adults whose fingertips have been regenerated after amputation. In these cases, the entire fingernail and fingerprint have been recreated **in as little as 21 days** against the previous reported cases between 1966 and 1995, using silver which required a period of 90 days. These regenerations are accomplished entirely by a non-surgical procedure with a much higher success rate than mainstream surgical procedures.

Such efficient and rapid regeneration is unprecedented. The closest attempt is a previous world record of 90 days for full regeneration using nano silver stem cell activation therapy.<sup>2</sup> Pages 155 - 156 This was documented in 1995 by the late Dr. Robert O. Becker at the State University of New York, and recorded in his US Patent 5,814,094.<sup>3</sup>

**A fingernail in the human body normally grows at a steady pace which requires five to six months to replace its entire length.**<sup>4</sup> Regenerating a fingernail in just 30 days or less, demonstrates the accelerated healing and regenerative capabilities of nano silver induced stem cell activation therapy. It also demonstrates improvements in stem cell activation techniques and fingertip regeneration techniques during the past few years which have made such incredible results a reality.

The ability of nano silver stem cell activators to dedifferentiate mature cells gives us the ability to produce more stem cells and consequently more progenitor cells than the body does under normal circumstances.<sup>5</sup> In addition, this ability of nano silver to stimulate all pre-existing stem cells to enhance the rate of production of progenitor cells results in an eventual regeneration of the fingertip in an unbelievably short span of time of 30 days or less.<sup>6</sup> This is roughly five times faster than the unaided body really can achieve. ***This clearly demonstrates***

***an approximately five-fold accelerated healing and regenerative capabilities of nano silver stem cell activation.***

The fingertip regeneration process occurs only if the wound is left uncovered by a flap of skin.<sup>2 - Pages 156</sup> This concept is quite contradictory to the standard surgical procedure in mainstream medicine. This is a major deviation in the thinking process for present day surgeons who would prefer to react to such situations by resorting to simple stitches or microsurgical techniques.

**Summary**

1. *In vivo* stem cell activation using nano silver not only helps to dedifferentiate mature cells but also helps to provide larger number of progenitor cells from existing stem cells, including those obtained through dedifferentiation, ensuring highly accelerated healing and regeneration.

2. *In vivo* stem cell activation has vastly reduced the dependence on use of very expensive harvested stem cells.

3. Regeneration of fingertips of children and adults appears feasible even if attempted long after the initial injury.

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**KEYWORDS:** stem cells, regenerative medicine, fingertip regeneration, fingertip regrowth, stem cell activation, nano silver, stem cell gel.

## Fingertip Regeneration Stem Cell Activation Therapy

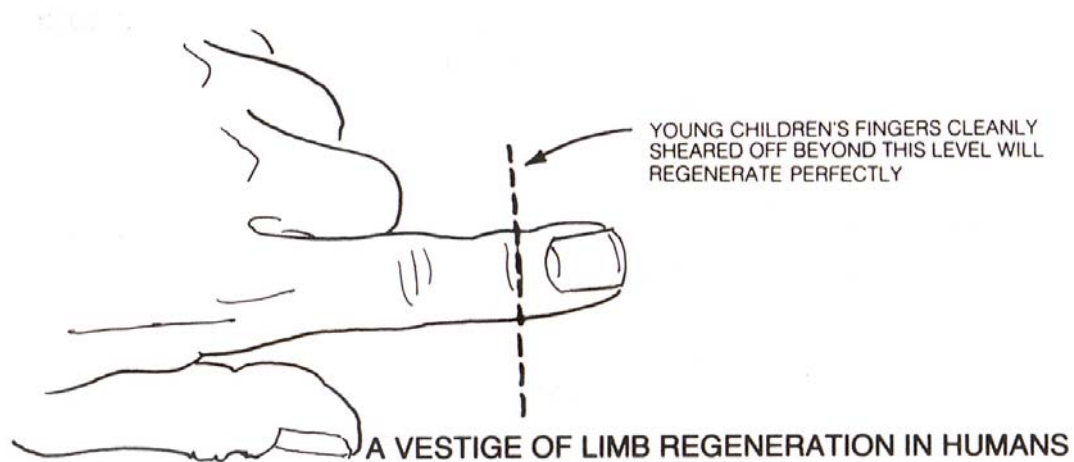
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### Integrating Stem Cell Activation Therapy Into Fingertip Regenerative Medicine

#### Prior Art

The amputation of a fingertip is one of the most common childhood injuries. *The standard treatment is to smooth the exposed bone and stitch the skin closed*, or, if the digit has been retrieved and was cleanly cut, to try to reattach it by microsurgery. *The sad fact is that even the most painstaking surgery gives less than optimal results.* The nail is usually deformed or missing, and the finger is short and often painful, with a diminished or absent sense of touch.

In the early 1970s, at the emergency room of Sheffield Children's Hospital in England, a child with such an injury benefited from a clerical mix-up. The attending physician dressed the wound, but the customary referral to a surgeon for closure was never made. When the error was caught a few days later, surgeon Cynthia Illingworth noticed that the fingertip was regenerating itself.



Spurred on by her discovery, Illingworth decided to treat other children the same way. Instead of suturing up badly damaged or amputated fingertips, Dr. Illingworth and her colleagues would simply clean the damaged finger, hold it in position with a sterile splint strip, cover it with a dressing and let nature take its course. By 1974, Illingworth had documented several hundred similar cases.<sup>1</sup>

Several other studies have confirmed Illingworth's findings that children *under the age of 11 are able to regrow their fingertips* providing that the finger is cleanly sheared off (the wound must not be covered by a flap of skin) beyond the outermost crease of the outermost joint. If the finger is damaged below this point regeneration does not take place.

In his book *The Body Electric*, Dr. Robert Becker writes of the confidence that some pediatric surgeons hold in fingertip regeneration in children: "*Some pediatric surgeons, like Michael Bleicher of New York's Mount Sinai Hospital, have become so confident in the infallibility of the process that they'll finish amputating a fingertip that's just hanging by a bit of flesh. A lost one will regenerate as good as new, whereas one that has merely been mutilated will heal as a stump or with heavy scarring.*"<sup>2</sup>

## Recent Research

### Post-Amputation Fingertip Regeneration

"Fingertip regrowth is a true composite tissue regeneration involving regeneration of bone, cartilage, tendon, blood vessels, skin, nail, cuticle, fingerprint, and half a dozen of specialized sensory nerve endings."

"Of great interest is the present case study of "*Fingertip Regrowth After Amputation.*" In this case, the entire fingernail and fingerprint have been recreated **in only 30 days** compared to the previous documented case in 1995, using silver which required a period of 90 days. This is accomplished entirely by a non-surgical procedure with a much higher success rate than mainstream surgical procedures."

"Such an efficient and rapid regeneration is unprecedented. The closest attempt is a previous world record of 90 days for full regrowth using silver.<sup>2</sup> - Pages 155 - 156 This is set in 1995 by the late Dr. Robert O. Becker at the State University of New York, and recorded in US Patent 5,814,094."<sup>3</sup>

**"A fingernail in the human body normally grows at a steady pace which requires five to six months to replace its entire length."**<sup>4</sup> If the same length can be regenerated in only a 30 day period, it demonstrates the accelerated healing and regenerative capabilities of nano silver induced stem cell activation therapy. It also demonstrates improvements in activation techniques during the past few years which have made such incredible results a reality."

"The ability of nano silver stem cell activators to dedifferentiate mature cells gives us the ability to produce more stem cells and consequently more progenitor cells than the body does under normal circumstances.<sup>5</sup> In addition, this ability of nano silver to stimulate all pre-existing stem cells to enhance the rate of production of progenitor cells results in an eventual regeneration of the fingertip in an unbelievably short span of time of 30 days.<sup>6</sup> This is roughly 5-times faster than the unaided body really can achieve. *This clearly demonstrates*

*that nano silver stem cell activation can accelerate the healing and regenerative capabilities of the body by approximately 5-fold.”*

*“It is important to stress that the fingertip regeneration process occurs only if the wound is left uncovered by a flap of skin.”*<sup>2 – Page 156</sup> This is quite contradictory to the standard surgical procedure in mainstream medicine. This is a major deviation in the thinking process for present day surgeons who would prefer to react to such situations by resorting to simple stitches or microsurgical techniques.”

*“Such cases of fingertip regrowth strongly suggests that the human body does have the ability to regenerate body parts given the right stimulus.”*

“Future developments in the application of stem cell activation could conceivably extend to making limb regeneration a reality.”

### **Case Study 1 – Fingertip Regeneration with Nano Silver Induced Stem Cell Activation**

“A seven year old boy suffered fingertip injury to the right hand middle finger. The amputated piece was sutured back as a free composite graft by the general surgeon. Inspection on the fifth day showed that the fingertip was totally nonviable, but the patient was not cooperative and did not allow the graft to be removed.

The patient was treated from the third day onwards with topical nano silver stem cell activators over the mentioned site of injury without removal of the graft.”

“Within 2 weeks of topical application of nano silver stem cell activators, the free composite graft finally fell off on its own.”

Figure 1 illustrates that *complete regeneration of the entire fingertip occurred in 4 weeks without any permanent deformity*. Figure 2 shows the boys finger 6 months later.

Extract reproduced from: Nano Silver Induced Stem Cell Activation published in *The Anti-Aging Therapeutics*, Volume 13, Textbook Series, Spring 2010, by A4M - The American Academy of Anti-Aging Medicine.





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## Fingertip Regeneration With Nano Silver Induced Stem Cell Activation – Case Study - 1

Courtesy: Dr. Neeta Patel, M.S., M.Ch. (Plastic)  
Plastic & Reconstructive Surgeon, Member, ISAPS



## Revisiting This Fingertip six Months Later



11/11/2010



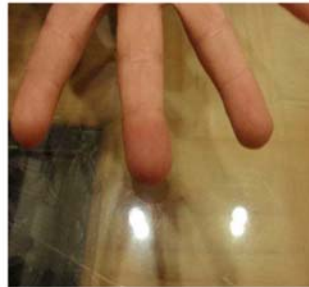
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### **Fingertip Regeneration – Case Study 1 Revisited No scar or deformity seen six months later**

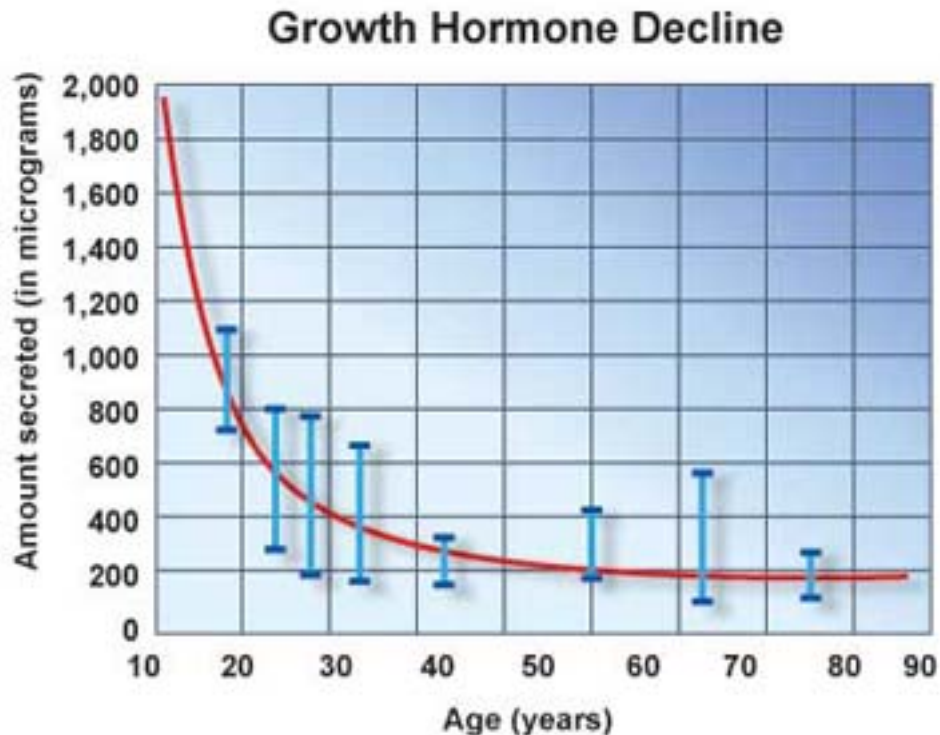
Courtesy: Dr. Neeta Patel, M.S., M.Ch. (Plastic)  
Plastic & Reconstructive Surgeon, Member, ISAPS

Will this child remember when he becomes an adult, which fingertip on which hand was accidentally amputated? Six months later, there is no trace of a scar or deformity left to indicate his fingertip was accidentally amputated. The nightmare is really over!

## New Insight

### Methods of improving the results achieved so far and the scope of the application of stem cell activation therapy to fingertip regeneration

One of the most important differences between an eleven year old child and a fully grown adult, as far as regenerative medicine is concerned, is the levels of growth hormones in their bodies. Growth hormone (GH) levels rapidly decline after the age of 11 years.



In order to improve the scope of application for the fingertip regenerative techniques discussed above, and to take them past the earlier age barrier of 11 years (proposed by the late Dr. Robert O. Becker, M.D. in his book *The Body Electric*, 1985), one must find the means to naturally increase and maintain growth hormone levels in the human body during the first few critical weeks or months when the regeneration of the fingertip is to occur. Amino acids such as arginine are known to cause the pituitary gland to naturally secrete growth hormones at an enhanced rate.

Human growth hormones (HGH) regulate more than just growth. Tissue repair, healing, cell replacement, organ health, bone strength, brain function, enzyme production, as well as the health of nails, hair, and skin all require adequate amounts of HGH.

Incorporating the use of growth hormone precursors with stem cell activation therapy, thereby stimulating the pituitary gland to increase growth hormone production, will ensure two important things. Firstly, it will result in a much higher efficiency in fingertip

regeneration. Secondly, it will also expand the scope of this regenerative science to healthy adults of any age and perhaps lay the foundation to regenerating other body parts as well.

Administration of multivitamin / mineral supplements to increase the availability of nutrition in the body will also help to improve the overall success rate of adult and child regenerated fingertips.

**What should you do in case of an old injured fingertip covered with a skin flap?**

**Prior Research - 1923 to 1946**

**Prior to the research of Dr. Robert O. Becker, M.D., Orthopedic Surgeon**

Early research on salamanders revealed that **sewing full-thickness skin grafts** over the stumps of amputated salamander legs **prevented regeneration** of the limbs. However, the researchers also found that **regeneration would occur if there was a tiny gap left in the skin graft.**

This discovery led S Meryl Rose, an anatomy instructor at Smith College, to predict that the **rapid formation of full-thickness skin** over the stumps of adult frogs' legs might be what **prevented them from regenerating.** Rose decided to investigate her theory by dipping the frogs' wounds in saturated salt solution several times a day to prevent the dermis from growing over the stump. Results showed that preventing the dermis from growing over the stump did indeed cause the frogs to begin regenerating their lost limbs. Indeed, the majority of the frogs whose forelimbs had been amputated between the elbow and wrist replaced some of what they had lost. Furthermore, **several regrew well-formed wrist joints, and a few even began to produce one new finger.**

In 1946, Lev Vladimirovich Polezhaev a young Russian biologist working in London began a series of experiments investigating limb regeneration in adult frogs. Polezhaev first showed that **pricking the limb stumps with a needle each day prevented dermal regrowth and stimulated limb regeneration.** He then went on to discover that a wide variety of irritants produced the same effect in frogs, although none of them worked in mammals, and that Rose's technique of dipping the amputated limb in salt worked by irritation, not by preventing dermal regrowth. His experiments also suggested that **making the injury worse may improve regeneration.**

## New Insight

### **Methods of improving the results achieved so far and the scope of the application of stem cell activation therapy to fingertip regeneration**

By combining stem cell activation therapy with the strategy to enhance the release of growth hormones in the body; creating a gap in the dermis; and by daily pricking the fingertip, one will help to improve the chances of success in adult fingertip regeneration in mammals even if the amputation has occurred years earlier.

Each prick creates a fresh point of injury which signals the body to send extra stem cells to the site and commence the regeneration process. Multiple pricks can expand the area of regeneration and cause a higher concentration of the body's own stem cells at that location. Topical application of nano silver stem cell activation gel can not only cause dedifferentiation of mature cells into fresh stem cells but can also cause enhanced production of progenitor cells.<sup>5,6</sup> This will regularly drive the concentration of highly activated stem cells even higher with each daily application of the stem cell activation gel to the freshly pricked area.

***The earlier barriers proposed by the late Dr. Robert O. Becker, M.D., in his book The Body Electric, 1985, that it will not work in mammals and adults, are now being gradually challenged as more adult cases have begun showing encouraging results.***

### **Case Study 2 – Adult Fingertip Regeneration with Stem Cell Activation Therapy**

A 23 year old female worker in a factory suffered an injury to the index finger of her right hand on January 28, 2011. Our first approach was to treat the wound with nano silver activated stem cell gel and to verify if the limitations experienced by the late Dr. Robert O. Becker, M.D., in the treatment of adults were applicable to this particular case. Treatment was started on February 02, 2011. After seeing very little progress at the end of six weeks, it was decided that the limitations experienced by Dr. Becker were equally applicable with our techniques of *in vivo* activating stem cells.

At that stage, and on March 16, 2011, six week later, we began implementing the technique of daily pricking of the finger to see if this strategy when combined with stem cell activation therapy would yield any better results. We were at this stage working on a skin covered fingertip roughly seven weeks from the date of the initial injury. A review of the situation after only twelve days, showed tremendous progress which had not been seen in the previous six weeks.

We then added growth hormone precursors and multivitamin / mineral supplements into the treatment to ensure quicker results. Another nine days later, we again saw a quantum jump in the regeneration of the fingertip.

Two weeks later, we decided to stop the daily “pricking” procedure but to continue with topical stem cell activation therapy and with growth hormone enhancing therapy, and let nature takes it own course to bring the finger tip to its final perfection.



**Adult Fingertip Regeneration – Case Study 2  
Treated With Stem Cell Activation Therapy & Growth Hormone Precursors**

Courtesy: Dr. Neeta Patel, M.S., M.Ch. (Plastic)  
Plastic & Reconstructive Surgeon, Member, ISAPS

What we can safely conclude, is that it would be advisable to add nutritional growth hormone enhancing therapy and nutritional supplements on day one of the stem cell activation therapy to enhance regeneration. It would also be advisable to add “pricking” at an appropriate time much earlier on in the treatment to ensure that the body continues to rely on its inherent regeneration capabilities. It seems possible that the total of ten weeks of treatment time seen in this case could easily be reduced to four weeks in future adult fingertip regeneration cases. ***The active period of treatment in this adult case has actually been from March 16<sup>th</sup> to April 05<sup>th</sup>, 2011, thereby totaling 21 days.*** This case can also be considered as a regeneration of an old injury fingertip as the active form of treatment was started only after six weeks. This would again be a considerable improvement over the 90 day period taken in 1995 by the late Dr. Robert O. Becker, M.D. for regenerating the fingertip of a 21 year old male, as reported in his US Patent No. 5,814,094.<sup>3</sup>

### **Case Study 3 – Regeneration of Adult Fingertip With Full Skin Coverage**

A 21 year old college student suffered an accident while riding her motorcycle. Her right hand and palm suffered maximum damage which required extensive suturing.

The middle finger suffered extensive damage with total loss of nail. The ring finger showed full thickness loss of skin and soft tissue with exposed extensor tendon with fractured and crushed distal phalanx, also with total loss of nail and nail bed. An area of composite tissue deficit was created in the ring fingertip as a result of the accidental fall from her bike.

Stem cell activation therapy in the form of a topical gel was immediately started on October 23, 2010. ***At the end of 23 days the middle finger showed excellent regeneration and was almost completely covered by a full length nail.*** The results achieved in this adult case are consistent with the results achieved in the case of a seven year old child and a 23 year old girl as discussed earlier. This strongly suggests that regeneration is entirely possible in 30 days with the current state of art achieved so far.

However, the ring finger which had more damage did not show much progress even in terms of regeneration of tissue loss. Regeneration of the ring finger seemed an uphill battle.

At this stage, further treatment was stopped by the patient.

Four months later, on March 15, 2011, the patient returned with more determination. There was hardly any progress to show in the case of the ring finger, which was now completely covered with skin. It was then decided to adopt the “pricking” procedure outlined above to recommence the body’s inherent regeneration process. At the same time, we restarted the topical application of the stem cell activation gel.

In about 10 days the area of deficit began to fill up with fresh tissue, but no nail could be seen emerging as the nail bed was still not completely formed. At this stage, it was decided to also introduce the growth hormone enhancing therapy into the equation. Four weeks later the finger took on a healthy look but no nail was in sight.





10/23/2010



11/16/2010



11/30/2010



11/30/2010 (stopped)



03/15/2010 + pricking



03/16/2011



03/18/2011



03/21/2011 + pricking



03/28/2011+ GH



03/30/2011



04/11/2011



05/24/2011

### Fingertip Regeneration – Case Study 3 Regeneration of Adult Fingertip With Full Skin Coverage

Courtesy: Dr. Neeta Patel, M.S., M.Ch. (Plastic)  
Plastic & Reconstructive Surgeon, Member, ISAPS



What was remarkable was that both the middle finger and the ring finger, now looked years younger than the other fingers. They had literally lost all the wrinkle lines normally seen in other fingers and the skin began looking like that of a child.

What we perhaps see at this stage, four weeks after recommencing the regeneration process, are two small vertical lines emerging from either side of the nail bed. The nail bed still does not appear to be completely developed due to the severe mutilation of the finger.

An examination of the finger ten weeks after recommencing the regeneration process shows the emergence of a nail plate from the nail root. The nail bed is still not perfectly developed and it is anticipated that the next 4 weeks should show some exciting results.

Updates to this case will be released from time to time when available.

## **Summary**

1. *In vivo* stem cell activation using nano silver not only helps to dedifferentiate mature cells but also helps to provide larger number of progenitor cells from existing stem cells, including those obtained through dedifferentiation, ensuring highly accelerated healing and regeneration.

2. *In vivo* stem cell activation has vastly reduced the dependence on use of very expensive harvested stem cells.

3. Regeneration of fingertips of children and adults appears feasible even if attempted long after the initial injury.

4. Such cases of regeneration of fingertips of children and adults strongly suggest that the human body does have the ability to regenerate body parts given the right stimulus.

5. Future developments in the application of stem cell activation and fingertip regeneration techniques could conceivably extend to making limb regeneration a reality.

## **Conclusions**

The techniques described above could also be possibly used to regenerate fingertips previously damaged and surgically treated in the past. The treatment being so very simple and risk free, it does not require complex medical skills or equipment to implement. It may be possible to have a registered nurse administer the daily treatment under the supervision and guidance of a family physician.

It would be worth pursuing the procedure outlined in these cases to begin collection of more clinical data to further develop the science of regenerating fingertips. This might lead to furthering our understanding and development of protocols for the regeneration of other body parts as well.

We request readers to come forward and refer more such challenging cases to us for furthering our knowledge in this groundbreaking research. This will enable rapid progress in the field of regenerative medicine for the benefit of mankind.

## **ABOUT THE AUTHOR**

Pramod Vora is a holistic educator, a health counselor, and an international faculty member for anti-aging medicine.

His research in the use of nano silver, useful in the dedifferentiation of mature cells into activated stem cells, has been integrated into many fields of regenerative medicine, making it affordable for all. His landmark research in stem cell activation therapy has enabled fingertip regeneration after amputation in a record period of only 21 days.

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