

The background of the slide is a photograph of two medicinal leeches (Hirudo medicinalis) resting on a clear glass dish. The leeches are dark brown with lighter, mottled patterns on their bodies. They are positioned on either side of the central text. The lighting is soft, highlighting the texture of the leeches and the surface of the glass.

# Leech Therapy - Hirudo Medicinalis

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# Leech Therapy

- Leeches were used for bleeding by Syrian physicians as early as 100 BC. Historically, the leeches were placed or directed to small areas such as the mouth, ear or other areas using a “leech tube” (ear infections, sinusitis)

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# Leech Therapy

- Today leech therapy is used in Plastic Surgery throughout the world as tools following reattachment of amputated digits, free flaps, pedicle flaps and replantation of amputated tissues (often includes an anastomosis between surgically ligated or traumatically severed blood vessels) that are compromised
- Venous congestion is a serious complication of these types of procedures

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# Venous Congestion

- Kinking or impingement on the veins and/ or thrombus formation within the veins can cause this reduction in the venous outflow
- If venous congestion is not corrected (either surgically or via some other means), the developed stasis within the vasculature of the tissue will cause the replanted region to necrose

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# Leeches and compromised Skin Grafts

- Leeches can help heal skin grafts by removing blood pooled under the graft and restore blood micro-circulation in blocked veins by removing pooled blood
- This is a relatively inexpensive and pain-free means of achieving good graft take

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# Leeches used

- The two main species used in medicine are the close relatives "Hirudo Medicinalis" and the "Hirudo Verbana"
- Both these species have distinct colour patterns on their ventral body surfaces

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# Leeches

- Leeches can live up to 1 year without feeding
- Once fed they are satiated for 30-50 days
- Once stomach contents are depleted, leeches can survive for months on its own body substance

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# Leeches

- Leeches are “protandrous” –first male then female and lay eggs in cocoons 1-9 months post copulation – about 4 cocoons each containing about 15 eggs- about 60 off-springs per year

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# Secrets of Salivary

## Glands of Medical Leech

- Contains more than 100 bioactive substances (very few are known in terms of chemical structure and mechanism) including bacteriostatic, analgesic, resolving actions, has anti-oedematous, improves immune system activity, it eliminates microcirculation disorders, restores permeability of tissues and organs, eliminates hypoxia, reduces BP, detoxifies the organism

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# Benefits of Leech Saliva

- Hirudin (a potent anticoagulant) enables the blood to flow for some time without clotting
- Calin is another constituent of leech saliva and the main function of this protein is to induce secondary bleeding, which can last up to 12 hours

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# Benefits of Leech Saliva

- Hyaluronidase -known as the "spreading factor" -further facilitates the penetration and diffusion of these pharmacologically active substances into the tissues- especially in joint pain (no empirical studies to confirm this) and has antibiotic properties

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# Benefits of Leech Saliva

- Destabilase - Dissolves fibrin and has thrombolytic effects
- Bdeellins - Anti-inflammatory effect and inhibits trypsin, plasmin and acrocin
- Acetylcholine - vasodilator
- Histamine-like substances - vasodilator, increases the inflow of blood at the bite site

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# Indications for Leech Therapy – Historic Perspective

- Cardiovascular diseases – hypertension and ischaemic disease
- Respiratory – pneumonia, bronchial asthma
- GI tract – hepatitis, cholecystitis, pancreatitis, stomach ulcers

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The background of the slide is a photograph of a person's face, specifically the forehead and eye area. Several medicinal leeches are attached to the skin. The leeches are dark, segmented, and have a distinct head with suckers. The person's eyes are partially visible, and they appear to be wearing glasses. The overall tone of the image is somewhat dim and clinical.

# Indications for Leech Therapy – Historic Perspective contd.

- ENT diseases
- Paradontosis and other teeth diseases
- Urological diseases
- Male sterility
- Skin diseased – neurodermatitis, psoriasis, herpes, eczema

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# Indications for Leech Therapy – Historic Perspective

- Gynaecological disorders – female sterility, endometriosis, fibromastopathy
- Hirudo-relexotherapy used by placing the leeches strategically on the reflexogenic points as a “life needle”

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# Indications for Leech Therapy (Micro Vascular Surgery)

- Skin colour – dusky or bluish
- Capillary return – brisker than normal
- Pinprick response – bleeding should be dark and rapid
- History – known problems with veins at operation, eg at the site of micro vascular anaestomosis

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# Micro vascular Surgery

- In Reconstructive surgery, traction or other pressure related changes in tissue tension, changes in blood flow patterns can therefore lead to impaired perfusion, vascular anastomosis concerns and thrombosis can sometimes occur

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# Micro vascular Surgery

- In pedicle flaps, perfusion problems may develop, but imbalances between arterial and venous drainage are more common. Deficient venous return leads to venous congestion (characterised by blue discolouration and the skin becomes increasingly mottled), or in extreme cases -thrombosis

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# Micro vascular Surgery

- Following reattachment of the ear post trauma. The microsurgical anastomosis of the hair thin blood vessels of the ear is extremely challenging
- Venous insufficiency sometimes occur and leeching can sometimes provide a good outcome

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# Leeches may not bite if :

- the skin is cold
- older humans
- Smokers
- perfumed skin

PS: In these cases wash area thoroughly and sometimes a pin prick may help to help attachment

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# Contraindications

- Anaemia
- In extreme ages i.e. in children and old age
- Weak patients
- Allergic patients
- In extreme hot or cold climate
- Diseases like haemophilia
- Pregnancy

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# Leech Therapy - Application

- One or two leeches may be sufficient to treat the skin of a degloved or replanted finger, whereas a large flap may require 6 or more depending on clinical response. The head (or biting end) of the animal can be recognised by the animal's movements, while the tail is mostly used as a sucker for attachment
- When leeches bite a victim, their saliva causes blood flow to increase and prevent clotting (vasodilator and anticoagulant)

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# Leech Therapy - Application Guidelines

- Clean patient's skin thoroughly with soap and water to remove odour, traces of operation prep fluids or saline. Rinse with water (wetting site encourages the leech to bite)
- Don gloves, pick leech with gloved hand, steer leech's head gently to the area to be treated - secure in place with Syringe cover or alternative means (plastic galipot)

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# Leech Therapy

- Following the bite, the area can bleed for up to 48 hours (up to 50 mls of blood), allowing oxygenated blood to enter the wound area until veins re-grow and regain circulation
- Leech therapy is usually required for 3-7 days, sometimes longer depending on the surgeon (up to 10 days or more)

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# Leech Therapy

- Leech bites sometimes leave small blood spots (ecchymoses) which sometimes develop into keloids in some individuals. Most of these spots disappear within 2-3 weeks
- To remove the leech, absolute care is required - Forcible removal of the leech may rupture gut contents (*Aeromonas hydrophilia*)
- Prophylactic Antibiotics- Ciprofloxacin / Ceftriazone

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# Disposal of Leeches

- All leeches used or unused must be accounted for and destroyed with 70% Alcohol and IMVS (Supplier) must be notified and these will be collected for disposal

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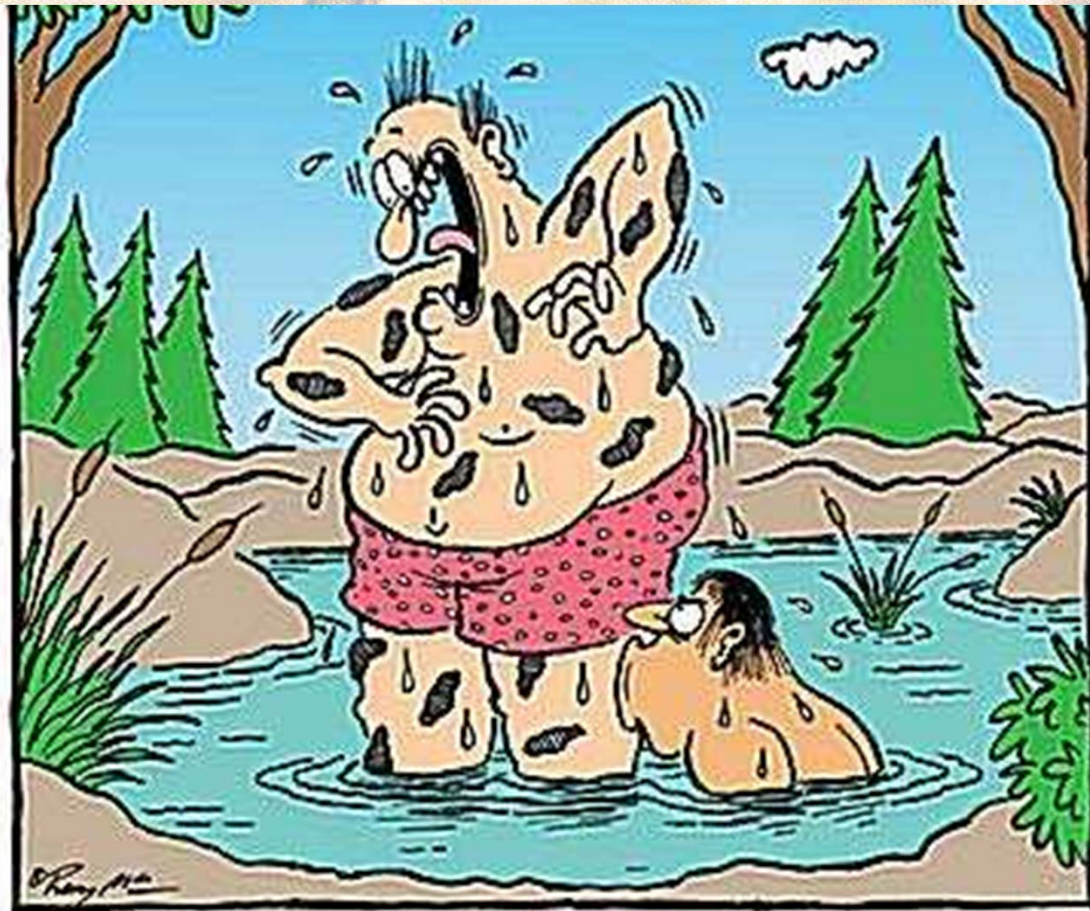
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Thank you-Any  
Questions?



TARZAN OF THE LEECHES

# References

1. Abbott SL, Cheung WK, Janda JM. The Genus *Aeromonas*: Biochemical characteristics, atypical reactions, and phenotypical identifications schemes. *J Clin Microbiol* 2003; 2348-2357
2. Abrutyn E. Hospital- associated infections from leeches. *Ann Int Med* 1988; 109: 356-358
3. De Chalain TM. Exploring the use of the medicinal leech: A clinical risk- benefit analysis. *J Reconstr Microsurg* 1996; 12: 165-172
4. Michalsen A, Klotz, Ludtke R, et al.: Effectiveness of leech therapy in osteo-arthritis of the knee: a randomized controlled trial. *Ann Rheum Dis* 2001; 60: 986
5. Godfrey, K. Use of leeches and leech saliva in clinical practice. *Nurs Times*. 1997; 93: 62-62
6. Derganc M, Zdravic F. Venous Congestion of flaps by application of leeches. *Br J Plast Surg*.1960; 13: 187-192
7. Banis JC, Upton J. Microsurgical reattachment of totally amputated ears. *Plast Reconstr Surg*. 1987; 79: 535-541

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# References contd

8. Knobloch K et al. Hirudo medicinalis-leech application in plastic and reconstructive microsurgery- a literature review. Handchir Mikroochir Plast Chir.2007; 39: 103-107
9. Conforti ML, Connor NP, Heisey DM, Hartig GK. Evaluation of performance characteristics of the medicinal leech for the treatment of venous congestion. Plast Recon Surg. 2002; 109: 228-235.
10. Lineaweaver WC, Hill MK, Buncke GM, et al. Aeromonas hydrophila infections following use of medicinal leeches in replantation and flap surgery. Ann Plast Surg. 1992; 29: 234-244
11. Utley DS, Koch RJ, Goode RL. The failing flap in plastic and reconstructive surgery: role of the medicinal leech. Laryngoscopoe. 1998; 1129-1135.

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