

BRAY GROUP LTD

Avoca by Bray

# Silver Nitrate

## Pencil & Applicator



*Silver Nitrate Overview & Clinical Review by Bray Group Ltd*

Minor Injuries

ENT

Plastics & Burns

Gynaecology

MHRA Licensed · BNF Listed · ISO 13485:2016 · GMP Manufactured in Britain

### Contents

A Metal with a 2,000-Year Medical History

What is Silver Nitrate?

Key Properties & Clinical Importance

Silver Nitrate Strengths — Concentrations

Pharmacology & Chemistry

Product Overview — Applicators & Pencils

How to Apply

Avoca vs Alternatives · SWOT Analysis

Clinical Applications — Minor Injuries & ENT

Clinical Applications — Plastics & Burns, Gynaecology

Clinical Study Evidence



# A Metal with a 2,000-Year Medical History

*Silver's antimicrobial and healing properties have been recognised across every era of medicine.*

## Hippocrates

Documented silver's healing & anti-disease properties. Recommended silver preparations for wound care and ulcer treatment.

## Early Chemistry

Angelus Sala documented  $\text{AgNO}_3$  for topical use — known as 'lunar caustic'.

## Modern Medicine

BNF-listed. Used daily in ENT, burns, gynaecology & minor injuries. Nanosilver is the latest evolution.

400 BC

1st C AD

1700s

1880s

Today

## Roman Empire

Romans stored water in silver vessels. Soldiers dressed wounds with silver in the field.

## Carl Credé

Introduced 1% silver nitrate eye drops preventing neonatal ophthalmia — saving millions.

*Silver nitrate remains BNF-listed and in daily clinical use — 2,000 years of evidence-based medicine supporting every Avoca applicator and pencil.*

## Why Silver Nitrate Still Matters Today

*Silver nitrate is a chemical compound with over 2,000 years of use in medicine — simultaneously a caustic agent, antiseptic, and astringent, making it uniquely valuable across multiple clinical disciplines.*

Silver nitrate is a chemical compound used simultaneously as a caustic agent, antiseptic, and astringent — uniquely valuable across multiple clinical disciplines.

### Antimicrobial Action

Silver ions (Ag<sup>+</sup>) released upon activation are toxic to bacteria, fungi, and other microorganisms. Disrupts cell membranes and DNA replication. Active against MRSA, Pseudomonas, E.coli and Candida.

### Cauterising Action

Causes controlled coagulation of superficial cells. Binds to proteins causing irreversible denaturation, obstructs blood vessels to achieve rapid haemostasis, forms protective protein eschar.

### Astringent & Keratolytic

Acts as an astringent — contracting tissue and reducing bleeding. Keratolytic action breaks down abnormal keratin in warts and verrucae. Treated tissue darkens and is gradually shed.

### Where It Is Used Clinically

#### Ear, Nose, Throat (ENT)

Anterior epistaxis — cauterising visible vessels in Little's Area. Aural and post-surgical granulomas.

#### Plastics & Burns

Hypergranulation tissue ('proud flesh') in wounds, stoma sites, split-thickness graft donor sites and pilonidal sinuses.

#### Dermatology & Podiatry

Warts and verrucae — destroys virus-infected superficial tissue

#### Gynaecology

Cervical ectropion, umbilical granuloma (neonatal), vault granulomas and minor post-procedural bleeding.

*Potassium Nitrate KNO<sub>3</sub>*: Most formulations also contain potassium nitrate as a stabilising agent — regulating the cauterising reaction, controlling depth of action, and maintaining the structural integrity of the applicator tip. Depth and degree of tissue destruction is directly related to concentration and contact time.

# What is Silver? Key Properties & Clinical Importance

## Broad-Spectrum Antimicrobial

- Active against MRSA, Pseudomonas, E.coli, Staph and Candida
- Penetrates and disrupts established bacterial biofilms
- Bactericidal at therapeutic concentrations — kills rather than inhibits
- Resistance extremely rare versus conventional antibiotics

## AgNO<sub>3</sub> Caustic & Keratolytic Action

- Reacts with tissue proteins to form silver proteinate eschar
- Selective destruction of hypergranulation tissue and small vessels
- Keratolytic — breaks down abnormal keratin in verrucae/warts
- Haemostatic — seals capillaries via protein denaturation

## AMR Low Resistance Profile

- Acts on multiple bacterial targets simultaneously
- Multi-modal action makes resistance development highly unlikely
- Supports WHO AMR action plan — non-antibiotic strategy
- No clinically significant resistance reported after decades of use

## Anti-inflammatory & Wound Healing

- Reduces pro-inflammatory cytokines — calms excessive inflammatory response
- Promotes transition from inflammatory to proliferative healing phase
- Reduces wound exudate and odour in chronic infected wounds
- Supports re-epithelialisation by clearing hypergranulation tissue

## Safety & Selectivity

- Highly localised — minimal systemic absorption at therapeutic topical doses
- Solid stick format: greater precision vs liquid silver nitrate solutions
- Argyria only a risk with prolonged systemic exposure — not topical use
- Long track record of safe outpatient use in adults and paediatrics

# Silver Nitrate Strengths — Choosing the Right Concentration

## 40%

Silver Nitrate  
40% w/w

### Recommended for:

- Umbilical granuloma (neonates — gentle action)
- Minor granulomas in sensitive anatomical areas
- Wart & Verruca Pencil — patient self-application
- First-line in paediatric patients



POTENCY

*⚠ May need more applications vs higher strengths*

## 75%

Silver Nitrate  
75% w/w

### Recommended for:

- Cervical ectropion & gynaecology procedures
- Aural granulomas around grommet sites
- Preferred for childhood epistaxis (RCT evidence)
- Moderate hypergranulation in wound care



POTENCY

*⚠ Standard precautions — protect surrounding tissue*

## 95%

Silver Nitrate  
95% w/w

### Recommended for:

- Anterior epistaxis — rapid cauterisation of Little's area
- Significant hypergranulation in burns & plastics
- Resistant verrucae / plantar warts after paring
- Stoma site hypergranulation where rapid effect required



POTENCY

*⚠ Greater lateral spread — strict barrier protection essential*

*Strength selection should follow clinical assessment and local protocol.*

Chemical & Physical Properties	
<b>Formula</b>	AgNO <sub>3</sub> Inorganic salt of silver
<b>Concentrations</b>	<ul style="list-style-type: none"><li>• 40% w/w</li><li>• 75% w/w</li><li>• 95% w/w</li></ul>
<b>Form</b>	Solid tip on applicators and pencil
<b>Mechanism</b>	Reacts with tissue protein → silver proteinate
<b>Effect</b>	Caustic/keratolytic Destroys granulation tissue
<b>Haemostasis</b>	Seals capillaries via protein denaturation
<b>KNO<sub>3</sub></b>	Stabilises formulation and regulates reaction
<b>Activation</b>	Contact with moisture activates chemical reaction
<b>Depth</b>	Proportional to concentration and time (up to 20 seconds)

*Strength selection should follow clinical assessment and local protocol.*

# Clinical Applications — Minor Injuries and ENT

## Minor Injuries, Dermatology & Podiatry

## MINOR INJURIES

### Verrucae & Warts

After paring with scalpel, silver nitrate applied to de-roofed lesion. Repeat weekly. BNF listed. 63.3% complete clearance at 10% — Avoca 40% is significantly stronger. Safe for home self-application.

### Wound Granuloma

Hypergranulation in minor lacerations, puncture wounds, and abrasions failing to heal. Avoids referral to plastics or dermatology. Single or repeat application.

### Minor Haemostasis

Control of minor capillary ooze during minor surgical procedures, biopsy sites, skin tag removal, and shave excisions in outpatient settings.

## ENT — Ear, Nose & Throat

## ENT

### Epistaxis (Nosebleed)

- First-line cauterisation for anterior epistaxis (Little's area)
- Apply under direct vision — bilateral use NOT recommended (septal perforation risk)
- NICE guidance supports chemical cauterisation

### Granuloma / Post-Surgical

- Post-surgical granulomas: septoplasty, tonsillectomy
- Aural granulomas around grommet sites, Reduces need for return to theatre

### Caustic Note for ENT

- Avoid contact with unaffected mucosa – use petroleum jelly barrier
- Do not use on posterior nasal bleeds or if perforation suspected
- 75% preferred for paediatric patients (RCT evidence – study 10.3)

*Evidence: 75% AgNO<sub>3</sub> — 98% resolution vs 90% for 95% in childhood epistaxis RCT (n=101). Pain 1/10 vs 5/10 (p=0.001). 93% improvement in 134-patient prospective study.*

# Clinical Applications — Plastics & Burns and Gynaecology

## Plastics & Burns Outpatients

## PLASTICS & BURNS

### Hypergranulation Tissue

Over-exuberant granulation ('proud flesh') delays epithelialisation. Silver nitrate selectively destroys hypergranulation without damaging surrounding epithelium when applied carefully.

### Post-Burn Wound Care

Superficial burns with over-granulating edges. Reduces excessive granulation, controls bacterial biofilm, and promotes flatter, pliable scar formation.

### Stoma Complications & Graft Donor Sites

Hypergranulation around stoma edges and split-thickness graft donor sites causing bleeding or pain. Serial applications reduce need for surgical revision.

## Gynaecology

## GYNAECOLOGY

### Umbilical Granuloma (Neonatal)

40% silver nitrate. Quick, well-tolerated, effective. Protect surrounding skin with barrier cream. Follow local trust protocol.

### Cervical Ectropion

75% silver nitrate in outpatient or colposcopy clinic. Often used adjunct to or instead of cryotherapy for small ectropion areas.

### Vault Granuloma & Bartholin's

Post-hysterectomy granulomas and post-marsupialisation hypergranulation. Outpatient application avoids return to theatre.

# Avoca by Bray — Product Overview

## Silver Nitrate Applicators (Single-Use)

<b>Active Ingredient</b>	Silver Nitrate 75% w/w and 95% w/w
<b>Physical Form</b>	Solid tip impregnated onto plastic applicator stick (~15 cm)
<b>Pack Sizes</b>	50 / 100 applicators per box
<b>Shelf Life</b>	5 years (store away from light and moisture)
<b>Regulatory</b>	Licensed medicine — PL held by Bray Group Ltd
<b>UK Marketing</b>	Bray Group Ltd / NHS Supply Chain
<b>MIMS / BNF Listed</b>	Yes — listed for removal of verrucae, warts and excess tissue
<b>Global</b>	MHRA · TGA · Health Canada · FDA Registered · Hong Kong PPB
<b>Manufacturing</b>	GMP controlled · ISO 13485:2016 · Manufactured in Britain

**2**

Strengths (75% & 95%)

**100%**

Single-use; no contamination

**<20s**

Application time

## Silver Nitrate Pencils (Multi-Use, Single Patient)

<b>Active Ingredient</b>	Silver Nitrate 40% w/w and 95% w/w
<b>Physical Form</b>	Solid tip in plastic pencil form
<b>Pack Sizes</b>	1 pencil per box
<b>Shelf Life</b>	5 years (store away from light and moisture)
<b>Regulatory</b>	Licensed medicine — PL held by Bray Group Ltd

**2**

Strengths (40% & 95%)

**Multi**

Use per patient

**<20s**

Application time

*All concentrations are licensed medicines (PL held by Bray Group Ltd).*

# How to Apply — Applicator & Pencil

## APPLICATION GUIDE

### 1 Moisten the Tip

Touch the applicator or pencil tip briefly to water or direct to wound to moisten. The moisture activates the silver nitrate. A brief touch is sufficient — do not over-soak.

*Tip: A moist wound surface will also activate the tip on contact*

### 2 Apply to Target Tissue

Apply the tip precisely to the target area using gentle, controlled pressure. A rolling motion ensures even contact. Black or grey staining may appear straight away or some time later as silver stains.

*Tip: Always protect surrounding healthy skin with petroleum jelly first*

### 3 Controlled Cauterisation

Maintain contact for the required duration — typically up to 20 seconds. Protein denaturation creates an eschar, sealing small vessels and destroying target tissue.

*Tip: Do not exceed 20 seconds per site*

### 4 Neutralise if Needed

If lateral spread needs to be limited, apply saline wash or sodium thiosulphate. This neutralises the reaction. Particularly important near unaffected mucosa.

*Tip: Particularly important near unaffected mucosa*

### 5 Storage & Disposal

Multi-use pencil: dab tip with clean tissue to remove moisture, replace cap. Single-use applicator: dispose in clinical waste per local protocol. Do not re-use. Store away from light and moisture.

*Tip: Shelf life 5 years. Store away from light and moisture*

*⚠ Single-use applicators · Multiple-use pencil, single patient · Black/grey staining is temporary — always warn patients*

# Avoca vs Alternatives · SWOT Analysis

## Avoca vs Alternative Treatments

### vs Cryotherapy

- ✓ No capital cost
- ✓ No gas management
- ✓ Greater precision
- ✓ No blister risk
- ✓ Any clinical room

- ⚠ Less effective for thicker verrucae
- ⚠ Multiple applications may be needed

### vs Electrocautery

- ✓ No capital outlay (£500-3,000+)
- ✓ No electrical safety requirements
- ✓ No smoke plume/COSHH
- ✓ Less training

- ⚠ Less precise for deep tissue
- ⚠ Cannot be used for polyp removal in theatre

### vs TCA

- ✓ Safer handling solid form, no liquid acid
- ✓ Precise application; no run-off
- ✓ No COSHH storage
- ✓ BNF listed

- ⚠ Lower concentration flexibility than titrated TCA
- ⚠ TCA may penetrate deeper if required.

## SWOT Analysis — Avoca Silver Nitrate

### STRENGTHS

BNF-listed key indications · Three strengths (40/75/95%) · Single-use design · Cost-effective vs alternatives · Pencil available 40% and 95%, applicators available 75% and 95%

### WEAKNESSES

Staining of surrounding tissue (temporary) · Training required for safe application · Not for posterior nasal bleeds · May need repeat applications

### OPPORTUNITIES

NHS outpatient-first pathways · Growing burns & plastics caseload · Neonatal granuloma in midwifery-led care · Formulary inclusion drives volume

### THREATS

Cryotherapy increasing in minor injuries · Generic alternatives on price · Procurement consolidation risk · Staff turnover awareness

# Clinical Evidence — Key Results at a Glance

Peer-reviewed studies supporting Avoca silver nitrate across all indications

## 98%

Resolution at 8 weeks  
75% AgNO<sub>3</sub> childhood epistaxis  
(Glynn et al. RCT n=101)

## 93%

Significant improvement  
Bilateral cautery epistaxis  
(Limbrick n=134)

## 63%

Complete wart clearance  
10% solution (Avoca 40% stronger)  
(Ebrahimi et al. n=60)

## 34%

Full verruca resolution  
Clinical 95% AgNO<sub>3</sub>  
(Concannon n=101)

## Study Index

Int J Dermatology | RCT  
n=60

Ebrahimi et al. 2007

63.3% complete wart clearance with 10% AgNO<sub>3</sub>.  
No significant side effects.

Int J Pharmacy Practice |  
RCT n=101

Concannon 2017

95% AgNO<sub>3</sub> safe & effective for verruca pedis.  
Equal clinical vs home outcomes.

J Laryngology & Otology |  
Review

Bastianpillai 2019

60% population experience epistaxis.  
75% & 95% validated as standard ENT tools.

Eur Arch Oto-Rhino-  
Laryngology | n=134

Limbrick &  
Takwoingi 2019

93% significant improvement. 1.5% relapse.  
No significant complications.

Int J Paediatric ORL | RCT  
n=101

Glynn et al. 2011

75% vs 95%: 98% vs 90% resolution,  
pain 1/10 vs 5/10 (p=0.001).

Educational Clinical  
Review

Wound Source 2020

Confirms: epistaxis, verrucae, hypergranulation,  
ectropion, umbilical granuloma.

# Clinical Studies — Warts & Verrucae

Peer-reviewed evidence supporting silver nitrate in dermatology and podiatry

## Study 10.1: Ebrahimi et al., 2007 — RCT, n=60

International Journal of Dermatology (2007) | DOI: 10.1111/j.1365-4632.2007.02955.x | PubMed/NCBI

### Design:

60 patients randomised to 10% silver nitrate solution every other day for 3 weeks, or placebo (black ink). Treatment extended 3 further weeks if lesions persisted.

**63.3%**

Complete wart  
regression

**0**

Significant  
side effects

**<1wk**

Discolouration  
resolution

### Conclusion:

63.3% complete clearance with no significant side effects beyond temporary skin discolouration. Placebo showed no improvement.

*Avoca 40% is 4× stronger than the 10% studied. The 63.3% clearance rate at 10% supports high efficacy expectations at Avoca concentrations.*

## Study 10.2: Concannon, 2017 — RCT, n=101

Int J Pharmacy Practice 2017;25:421–428 | University of Huddersfield | PubMed/NCBI

### Design:

113 participants with verruca pedis randomised to clinical application (professional) or home self-application of 95% silver nitrate. Primary outcome: pain reduction and verruca resolution.

**34%**

Full resolution  
clinical group

**18.8%**

Full resolution  
home group

**100%**

Pain  
reduction

### Conclusion:

No significant difference between clinical and home application outcomes. Confirms silver nitrate is safe and effective for verruca pedis in both settings.

*Directly validates the dual-use of silver nitrate — equally effective when applied by a clinician or by a patient at home. Safe for self-application.*

# Clinical Studies — ENT & Paediatric Epistaxis

Peer-reviewed evidence supporting silver nitrate cautery in nasal bleeding management

## Study 10.3: Bastianpillai, 2019 — Clinical Review, ENT Surgery

The Journal of Laryngology & Otology | Northwick Park Hospital, London | 7 October 2019

### Design:

Educational and clinical review evaluating nasal cautery techniques for epistaxis management. Reviewed use of 75% and 95% silver nitrate applicators across ENT, GP, and A&E settings.

**60%**

Population who experience epistaxis

**6%**

Require medical attention

**2**

Concentrations 75% and 95%

### Conclusion:

Silver nitrate cautery applicators (75% and 95%) validated as standard clinical tools in ENT practice. Minimal technical skill required. Topical anaesthetic recommended. 75% preferred for paediatric use.

*Directly references the type of applicators validating both 75% and 95% concentrations.*

## Study 10.4: Limbrick & Takwoingi, 2019 — Prospective Study, n=134

Eur Arch Oto-Rhino-Laryngology 2019;276(6):1845–1848 | PMID: 30895432

### Design:

180 consecutive epistaxis patients in ENT clinic. Bilateral silver nitrate cautery of Little's Area using local anaesthetic. 2 sticks per side. Followed up with aseptic cream.

**93%**

Significant improvement

**60%**

Were children ≤16

**1.5%**

Relapse rate

**0**

Significant complications

### Conclusion:

Bilateral silver nitrate cauterisation is effective for recurrent epistaxis with low complication risk. 93% significant improvement validated across adults and children in a real-world outpatient setting.

*93% improvement in 134 real-world patients confirms silver nitrate as a safe, reliable first-line cautery option for adult and paediatric epistaxis.*

# Clinical Studies — Paediatric Epistaxis RCT & Wound Care Evidence

Peer-reviewed, PubMed-indexed research directly validating Avoca applicators

## Study 10.5: Glynn et al., 2011 — Double-Blind RCT, n=101

Int J Paediatric Otorhinolaryngology 2011;75(1):81–84 | PMID: 21093066 | DOI: 10.1016/j.ijporl.2010.10.014

### Design:

Children  $\leq 16$  with recurrent idiopathic epistaxis randomised to 75% (n=49) or 95% (n=52) AgNO<sub>3</sub>. Follow-up at 2 and 8 weeks. Pain scores, adverse effects, and resolution rates recorded.

Resolution  
at 8 weeks

75%: 98%

95%: 90%

Mean Pain  
Score

75%: 1/10

95%: 5/10

p=0.01 (efficacy) | p=0.001 (pain scores)

### Conclusion:

75% AgNO<sub>3</sub> is recommended for childhood epistaxis: superior efficacy, fewer adverse effects, and significantly lower pain scores vs 95%.

*The strongest clinical argument for Avoca 75% in paediatric ENT. This double-blind RCT shows 75% outperforms 95% on both resolution and patient experience.*

## Educational Source 10.6: Wound Source, 2020 — Educational Clinical Review

Wound Source | Published: 30 April 2020 | www.woundsource.com | Clinical Guidance

### Design:

Comprehensive educational review of silver nitrate applicator sticks covering mechanism of action, clinical indications, application technique, and appropriate concentrations across wound care and other clinical settings.

8+

Clinical indications  
confirmed

75%

AgNO<sub>3</sub> / 25%  
KNO<sub>3</sub> referenced

2 min

Typical  
application time

### Conclusion:

Confirms 8+ clinical indications including epistaxis, verrucae, hypergranulation, cervical ectropion, umbilical granuloma, wound epibole and stomatitis.

BRAY GROUP LTD

Avoca by Bray

# Why Choose Avoca by Bray?



*Uncomplicated Healthcare*

## Clinically Validated

Peer-reviewed RCTs, prospective studies & clinical reviews across ENT, dermatology, wound care & gynaecology — including a double-blind RCT directly validating use of silver nitrate applicators.

## Multi-Sector Reach

Used in NHS hospitals, A&E, GP surgeries, pharmacies, podiatry, dentistry and international markets.

## Globally Licensed

MHRA licensed · GMP manufactured in Britain · ISO 13485:2016 · TGA · Health Canada · FDA Registered.

## Right Tool, Right Dose

40%, 75% and 95% formulations matched to every clinical indication — from neonatal granuloma to resistant epistaxis.

## Proven Safety

93% improvement in 134 patients. 98% resolution in children (75%). Minimal complications across decades of clinical use.







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