Preparations

Proprietary Preparations (details are given in Part 3)
Austral.: Spray-Tish; ***Austria:*** Rinorix; ***Belg.:*** Rhinospray; ***Cz.:*** Muconasal Plus; ***Ger.:*** Biciron; Ellatun; Rhinospray; ***Ital.:*** Rinogutt Spray-Fher; ***Neth.:*** Bisolnasal; ***Port.:*** Rhinospray; ***Spain:*** Rhinospray.

Multi-ingredient: ***Arg.:*** Dexa-Rhinospray N; ***Austral.:*** Spray-Tish Menthol; ***Austria:*** Rhinospray Plus; ***Belg.:*** Dexa-Rhinospray; ***Ger.:*** Dexa Biciron; Oxy Biciron; Rhinospray Plus; Rhinospray sensitiv; ***Gr.:*** Dexa-Rhinaspray-N; ***Hung.:*** Rhinospray Plus; ***Irl.:*** Dexa-Rhinaspray Duo; ***Ital.:*** Rinogutt Antiallergico Spray; Rinogutt Eucalipto-Fher; ***Neth.:*** Rhinospray met menthol; ***Rus.:*** Adrianol (Адрианол); ***Spain:*** Rhinospray Antialergico; ***UK:*** Dexa-Rhinaspray Duo†.

Tuaminoheptane Sulfate *(rINNM)* ⊗

Sulfato de tuaminoheptano; Tuaminoheptane, Sulfate de; Tuaminoheptane Sulphate *(BANM)*; Tuaminoheptani Sulfas.

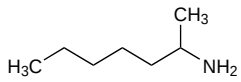
Туаминогептана Сульфат

$(C_7H_{17}N)_2,H_2SO_4$ = 328.5.

CAS — 6411-75-2.

ATC — R01AA11; R01AB08.

ATC Vet — QR01AA11; QR01AB08.



(tuaminoheptane)

Profile

Tuaminoheptane is a volatile sympathomimetic (p.1407) that has been used as the sulfate for the symptomatic relief of nasal congestion. Tuaminoheptane has also been used in the form of the carbonate.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Braz.:*** Rinofluimucil; ***Fr.:*** Rhinofluimucil; ***Ger.:*** Rinofluimucil-S†; ***Hong Kong:*** Rinofluimucil; ***Hung.:*** Rinofluimucil; ***Ital.:*** Rinofluimucil; ***Port.:*** Rinofluimucil; ***Rus.:*** Rinofluimucil (Ринофлуимуцил); ***Spain:*** Rinoflumil; ***Switz.:*** Rinofluimucil; ***Thai.:*** Rinofluimucil.

Tymazoline Hydrochloride *(BANM)* ⊗

2-Thymyloxymethyl-2-imidazoline Hydrochloride; Timazolina, hidrocloruro de; Tymazolini Hydrochloridum; Tymazoliny chlorowodorek. 2-(2-Isopropyl-5-methylphenoxymethyl)-2-imidazoline hydrochloride.

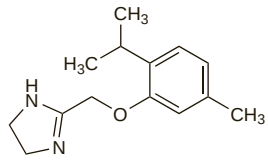
Тимазолина Гидрохлорид

$C_{14}H_{20}N_2O,HCl$ = 268.8.

CAS — 24243-97-8 (tymazoline); 28120-03-8 (tymazoline hydrochloride).

ATC — R01AA13.

ATC Vet — QR01AA13.



(tymazoline)

Pharmacopoeias. In *Pol.*

Profile

Tymazoline is a sympathomimetic that has been used as the hydrochloride similarly to naphazoline (p.1565) for its local vasoconstrictor effect in the symptomatic relief of nasal congestion (p.1548).

Preparations

Proprietary Preparations (details are given in Part 3)
Pol.: Thymazen; ***Thai.:*** Pernazene.

Xylometazoline Hydrochloride

(BANM, rINNM) ⊗

Hidrocloruro de xilometazolina; Ksilometazolin Hidroklorür; Ksilometazolino hidrochloridas; Ksylometatsoliinihydrokloridi; Ksylometazoliny chlorowodorek; Xilometazolinhidroklorid; Xylométazoline, chlorhydrate de; Xylometazolinhydro; Xylometazolin-hydrochlorid; Xylometazolini hydrochloridum. 2-(4-*tert*-Butyl-2,6-dimethylbenzyl)-2-imidazoline hydrochloride.

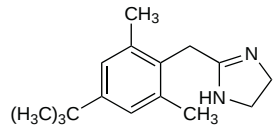
Ксилометазолина Гидрохлорид

$C_{16}H_{24}N_2,HCl$ = 280.8.

CAS — 526-36-3 (xylometazoline); 1218-35-5 (xylometazoline hydrochloride).

ATC — R01AA07; R01AB06; S01GA03.

ATC Vet — QR01AA07; QR01AB06; QS01GA03.



(xylometazoline)

Pharmacopoeias. In *Eur.* (see p.vii) and *US.*

Ph. Eur. 6.2 (Xylometazoline Hydrochloride). A white or almost white, crystalline powder. Freely soluble in water, in alcohol, and in methyl alcohol. Protect from light.

USP 31 (Xylometazoline Hydrochloride). A white to off-white, odourless, crystalline powder. Soluble 1 in 35 of water; freely soluble in alcohol; sparingly soluble in chloroform; practically insoluble in ether and in benzene. pH of a 5% solution in water is between 5.0 and 6.6. Store in airtight containers. Protect from light.

Adverse Effects and Precautions

As for Naphazoline, p.1565.

Interactions

Since xylometazoline is absorbed through the mucosa interactions may follow topical application. The *BNF* considers that all sympathomimetic nasal decongestants may cause a hypertensive crisis if used during treatment with an MAOI. For the interactions of sympathomimetics in general, see p.1407.

Uses and Administration

Xylometazoline is a direct-acting sympathomimetic (p.1408) with marked alpha-adrenergic activity. It is a vasoconstrictor which reduces swelling and congestion when applied to mucous membranes. The effect begins within 5 to 10 minutes of application and lasts for up to 10 hours.

Xylometazoline is used as the hydrochloride for the short-term symptomatic relief of nasal congestion (p.1548). A 0.1% solution of xylometazoline hydrochloride is applied topically as nasal drops or a spray into each nostril two or three times daily. For children's doses, see Administration in Children, below.

Xylometazoline hydrochloride solution is instilled into the eye as a conjunctival decongestant (see Conjunctivitis, p.564). Preparations containing 0.05% xylometazoline hydrochloride with 0.5% antazoline sulfate are typical; 0.1% xylometazoline hydrochloride has also been used.

Administration in children. Over-the-counter cough and cold preparations containing sympathomimetic decongestants (including xylometazoline) should be used with caution in children and generally avoided in those under 2 years of age (see p.1547). However, the *BNFC* suggests that, in certain circumstances, specialists may prescribe xylometazoline nasal drops for children under 2 years in the short-term treatment of severe nasal congestion which has not responded to sodium chloride nasal drops or inhalation of warm moist air. A 0.05% solution of xylometazoline hydrochloride is licensed for use in children aged from 2 to 12 years; 1 or 2 drops are instilled into each nostril once or twice daily, for a maximum of 7 days. The *BNFC* suggests that younger children aged 3 months and over may be given similar doses.

Preparations

BP 2008: Xylometazoline Nasal Drops;
USP 31: Xylometazoline Hydrochloride Nasal Solution.

Proprietary Preparations (details are given in Part 3)

Arg.: Nastizol; Otrivina; ***Austral.:*** Otrivin; ***Austria:*** Olynth; Otrivin; Ratio-Soft; Xylo-COMOD; ***Belg.:*** Nasa Rhinathiol; Nasasinutab; Nuso-San; Otrivine Anti-Rhinitis; Rhinidine†; ***Braz.:*** Orlaxyl†; Otrivina; ***Canad.:*** Balminil Nasal Decongestant; Certified Decongestant; Decongest†; Decongestant Nasal Spray; Decongestant Nose Drops; Nasal Decongestant; Otrivin; ***Cz.:*** Dr Rentschler Snupfenspray†; Dr Rentschler Snupfentropfen†; Mar Rhino; Nasenspray AL; Nasentropfen AL; Olynth; Otrivin; Rhino-Stas; Xylo-COMOD; ***Denm.:*** Otrivin; Passagen; Zymelin; ***Fin.:*** Naso-Ratiopharm; Nasolin; Otrivin; Zymelin†; ***Ger.:*** Balkis; Gelonasal; Imidin K†; Imidin N; Mentopin Nasenspray†; Nasan; Nasengel; Nasengel AL; Nasenspray; Nasenspray AL; Nasenspray E; Nasenspray K; Nasenspray-CT; Nasentropfen AL; Nasentropfen E; Nasentropfen K; Nasentropfen Stada; Olynth; Otriven; Otriven gegen Schnupfen; Rapako xylo; Rhinex mit Xylometazolin; schnupfen endrine; Siozwo Akut†; Snup; stas Nasentropfen, Nasenspray†; Tussamag Nasenspray; Xylo; Xylo Siozwo†; Xylo-COMOD†; Xylo-POS; ***Gr.:*** Otrivin; Otrivin-Menthol; ***Hong Kong:*** Decongestant Nasal Spray; Otrivin; Xyloma; ***Hung.:*** Nasan; Novorin; Otrivin; Rhinathiol; Rhino-Stas; ***India:*** Decon; Nazalin; Otrivin; ***Indon.:*** Otrivin; ***Irl.:*** Otrivine; ***Israel:*** Nazalet; Otrivin; Xylovit; ***Ital.:*** Neo Rinoleina; Otrivin; Respiro; ***Malaysia:*** Otrivin; ***Neth.:*** Kruidvat Neusdruppels; Kruidvat Neusspray; Mucorhinyl; Otrivin; Xylo-COMOD; ***Norw.:*** Naso; Nazaren; Otrivin; Xolin; Zymelin; ***NZ:*** Otrivine; ***Philipp.:*** Otrivin; ***Pol.:*** Otrivin; Xylogel; Xylorin; ***Port.:*** Otrivina; ***Rus.:*** Dlianos (Длянос); Grippostad Rhino (Гриппостад Рино); Halazolin (Галазолин); Olynth (Олинт); Otrivin (Отривин); Rhinonorm (Ринонорм); Rhinostop (Риностоп); Suprima-Nos (Суприма-Нос); Tyzine Xylo (Тизин Ксило); Xymelin (Ксимелин); ***S.Afr.:*** Otrivin; ***Singapore:*** Otrivin; ***Spain:*** Amidrin; Idasal; Otrivin; Rinoblanco; ***Swed.:*** Nasoferm; Otrivin; Zymelin; ***Switz.:*** Nasben; Nasobol Xylo; Olynth; Otrivin; Rhinostop; Rhume†; Rinosedin; Xylo-Mepha; ***Thai.:*** Otrivin; ***Turk.:*** Naze; Otrivine; Rinizol; Xylo-COMOD; ***UAE:*** Xylolin; ***UK:*** Non-Drowsy Sudafed Decongestant Nasal Spray; Otradrops; Otraspray; Otrivine; Tixycolds Cold and Allergy; ***USA:*** 4-Way Moisturizing Relief; Otrivin.

Multi-ingredient: ***Chile:*** Bacitopic Compuesto; Nasomin; Rinobanedif; ***Denm.:*** Otrivin Menthol; ***Fin.:*** Otrivin Menthol; ***Ger.:*** Lomupren compositum†; Nasic; ***Irl.:*** Otrivine-Antistin; ***Israel:*** Aforinol; ***Ital.:*** Inalar; ***Malaysia:*** Rynacrom Compound†; ***Mex.:*** Rinadex Compuesto; ***Neth.:*** Otrivin Menthol; ***NZ:*** Otrivine Menthol; Otrivine-Antistin; ***Swed.:*** Otrivin Menthol; ***Switz.:*** Lomusol-X†; Muco-Trin†; Triofan; ***Thai.:*** Rynacrom Compound†; ***Turk.:*** Rynacrom Compound; ***UK:*** Otrivine-Antistin; Rynacrom Compound†.

Zipeprol Hydrochloride *(rINNM)*

CERM-3024; Hidrocloruro de zipeprol; Zipéprol, Chlorhydrate de; Zipeproli Hydrochloridum. α-(α-Methoxybenzyl)-4-(β-methoxyphenethyl)-1-piperazineethanol dihydrochloride.

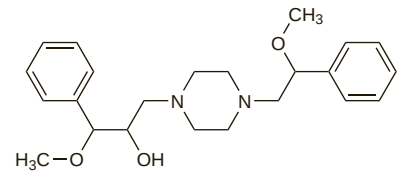
Зипепрола Гидрохлорид

$C_{23}H_{32}N_2O_3,2HCl$ = 457.4.

CAS — 34758-83-3 (zipeprol); 34758-84-4 (zipeprol hydrochloride).

ATC — R05DB15.

ATC Vet — QR05DB15.



(zipeprol)

Profile

Zipeprol is a centrally acting cough suppressant that is stated to have a peripheral action on bronchial spasm. It has been given as the hydrochloride, typically in an oral dose of 150 to 300 mg daily in divided doses. There have been reports of abuse and overdosage producing neurological symptoms.

Abuse and overdosage. Severe neurological symptoms have been reported in young adults after habitual abuse of zipeprol for euphoria. Patients have presented with generalised seizures, followed by coma.[1] One patient who ingested 750 mg of zipeprol [over twice the maximum daily dose] had several opisthotonic crises and developed cerebral oedema.[2] Symptoms of overdosage in children have included restlessness, somnolence, ataxia, choreic movements, forced deviation of the head and eyes, generalised seizures, respiratory depression, and coma.[1,3] Fatalities have been reported.

Dependence and withdrawal symptoms similar to those produced by opioids have been reported.[4] WHO has assessed zipeprol to have a moderate potential for dependence and liability for abuse.[5] Although zipeprol is a weak opioid agonist at high doses its toxicity and hallucinogenic and other psychotropic effects constitute a significant element in its abuse, and the public health and social problems associated with such abuse were considered substantial.

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Preparations

Proprietary Preparations (details are given in Part 3)

Chile: Frenotos; ***Gr.:*** Dovavixin†; Duo-Extolen†; Jactuss†; ***Mex.:*** Respilene†; Tusigen; ***Venez.:*** Coloplex†.

- Interferons have antiviral, antiproliferative, and immunomodulatory actions and have thus been investigated in the management of warts; some studies, especially those involving intralesional administration, have showed benefit. Other routes of administration are under investigation; topical interferon alfa for anogenital warts, and an oral formulation for warts in the oral cavity of patients with HIV infection.
- Cidofovir is an antiviral that has activity against human papillomavirus. Investigational intravenous or topical use has been successful in a small number of patients with cutaneous or anogenital warts.
- Sinecatechins is a mixture of complex polyphenols extracted from green tea leaves. Although its mechanism of action is unclear, it is used in the treatment of external genital and perianal warts.

A quadrivalent recombinant human papillomavirus vaccine has recently been developed and is used to prevent anogenital warts, cervical cancer, and other pre-cancerous lesions caused by human papillomavirus types 6, 11, 16, and 18.

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5. Gibbs S, Harvey I. Topical treatments for cutaneous warts. Available in The Cochrane Database of Systematic Reviews; Issue 3. Chichester: John Wiley; 2006 (accessed 26/09/07).
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Wounds and ulcers

Wounds (physical injuries of the skin and underlying structures) may be the result of mechanical trauma, burns, or chemical injury. Ulcers are often the result of various underlying disorders. Among the commonest types, *decubitus ulcers* (bedsores, pressure sores) occur in patients with extended immobility when prolonged pressure on the skin over a bony prominence produces localised ischaemia. *Leg ulcers* may result from venous incompetence (venous ulcers) or be ischaemic in origin (arterial ulcers), while patients with peripheral neuropathy, such as diabetics or those with leprosy, may develop *neuropathic ulcers* due to repetitive inadvertent injury. Wounds or ulcers may be described as superficial, partial thickness, or full thickness. Superficial wounds are limited to epithelial tissue and heal rapidly by regeneration of epithelial cells. Partial thickness wounds involve the dermis and include some blood vessel damage, and therefore wound repair is a longer process. Full thickness wounds extend at least to subcutaneous fat, and healing requires synthesis of new connective tissue.

Healing mechanisms are essentially the same regardless of the cause of the damage:

- immediate haemostatic processes involve formation of a platelet plug and fibrin clot, as described under Haemostasis and Fibrinolysis, p.1045
- the early granulation and re-epithelialisation phase takes place up to about 21 days after injury depending on wound size and site. Platelet-derived growth factors stimulate fibroblasts to produce granulation tissue, comprising a collagen matrix well-supplied with capillary vessels, and growth of epidermal cells leading to re-epithelialisation of the wound surface
- during the final dermal repair and remodelling phase the collagen matrix undergoes strengthening and there is a reduction in vascularity. This phase can continue for up to 2 years after injury.

Several factors are important for efficient wound healing. Adequate supplies of nutrients, especially vitamin C and zinc (which are often given as supplements) and oxygen are needed. A good blood supply is thus essential. Clinical infection, either systemic or local, due to contamination by environmental microbes, causes tissue damage and delays healing. The process of wound repair requires many cellular and acellular factors, such as platelets and growth factors, and deficiencies in these may also be responsible for delayed healing. Thus, the patient's age, systemic conditions, concomitant drugs, nutritional status, and congenital deficiencies all influence the rate of healing.

Local **wound management** includes cleansing, removal of exudate, and prevention of microbial contamination. Choice of wound treatment preparation will depend on the size, location, type, and cause of the wound, on the presence of infection, and on the particular stage of healing.

Wound **cleansing** is required to remove any dirt or foreign bodies and to **remove exudate** and slough (pus and necrotic tissue). This helps to prevent infection and aids healing. Commonly used cleansing solutions are sodium chloride 0.9%, hypochlorite, hydrogen peroxide, povidone-iodine, and chlorhexidine. However, some antiseptics and hypochlorites might be associated with delayed wound healing, especially with prolonged use, as they delay collagen production and cause inflammation. Also, many antiseptics are inactivated by organic material. Sodium chloride solution may be all that is required for routine cleansing of non-infected wounds.

Many of the cleansing solutions also help to remove slough. Other wound management preparations more specifically directed at removing slough include dextranomer, hydrogels, hydrocolloids, and enzyme preparations such as a mixture of streptokinase and streptodornase. Dextranomer, hydrogels, and hydrocolloids cause debridement by their occlusive, rehydrating properties. Surgical debridement is a fast and efficient way of removing necrotic tissue. Larval therapy (the use of live sterile maggots of *Lucilia sericata*, the common greenbottle fly) has also been effective for debridement of infected or necrotic wounds, including diabetic foot ulceration.

Wounds may produce large volumes of exudate as a result of inflammatory reactions, especially during the first few days. Hydrocolloid and alginate preparations and foam dressings are effective moisture absorbers.

All wounds are colonised by bacteria to some extent and there is no evidence that this superficial **infection** affects healing. However, infection with *Pseudomonas aeruginosa* may delay healing and sulfadiazine silver is used especially in burns. Acetic acid has also been used. Infections are treated systemically if there are indications of clinical infection such as sudden pain, cellulitis, and increased discharge; systemic management of bacterial skin infections is described on p.194.

Wound **dressings** and packing preparations help to protect the wound and provide the correct environment for wound healing. Some also help by absorbing exudate. Superficial wounds usually only require a low-adherent dressing. Alginates may be used for exuding wounds. Traditional dry dressings such as cotton wool, gauze, and lint are not used for partial or full thickness cavity wounds since they shed fibres, adhere to the wound, and cause wound dehydration. Hydrogels, hydrocolloids, polysaccharides, cadexomer-iodine, alginates, and foam dressings are all effective cavity wound preparations. Hyaluronic acid is incorporated into some dressings to promote wound healing.

Activated charcoal is very effective at reducing offensive odours from **malodorous wounds**, as are sugar (sucrose) pastes. Sucrose may exert its antibacterial effect by competing for water present in the cells of bacteria. Metronidazole is active against anaerobic bacteria that are associated with the pungent smell and is used topically for deodorising malodorous tumours. Metronidazole is not generally used on wounds because of the risk of inducing resistance but it is sometimes used to deodorise malodorous venous leg ulcers or decubitus ulcers.

In addition to the use of wound preparations, there may be other measures that aid healing of specific wounds or ulcers. Some wounds may require skin grafting. Skin substitutes, and growth factors, such as becaplermin, molgramostim, trafermin, and urogastrone, are being used or developed for non-healing ulcers and wounds. Topical phenytoin has produced some encouraging results in promoting the healing of various types of ulcers. Measures that aid the return of fluid from the leg, such as flexing the ankles, elevation, and use of compression bandages are beneficial in **venous ulcers**. There is insufficient evidence to recommend one type of dressing in preference to another, including the use of hydrocolloid dressings instead of simple low adherent dressings. The bioflavonoids, given orally, may improve venous insufficiency and therefore also aid healing. Systemic drugs that improve the supply of oxygen to tissues, for example pentoxifylline, may be useful in ischaemic and venous ulcers. Topical and systemic ketanserin has been investigated in a few patients and may be beneficial in wounds and ulcers where there is impaired blood flow. Hyperbaric oxygen therapy has been tried in a range of chronic wounds; it might be useful in reducing amputation in patients with chronic diabetic foot ulcers. Vascular surgery may be necessary in the management of some ulcers caused by ischaemia or chronic venous insufficiency. In **decubitus ulcers**, relief of pressure is the most important measure in management. The management of **burns** and **chemical burns** is described on p.1578.

General references.

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Abrasive Agents

Abrasivos.

Абразивные Вещества; Шлифовальные Средства

Aluminium Oxide

Aliuminio oksidas; Alumiinioksidi; Aluminii Oxidum; Aluminio, óxido de; Aluminiumoxid; Alumínium-oxid; Glinu tlenek.

Алюминия Оксид

Al_2O_3 = 102.0.

CAS — 1344-28-1.

ATC — D10AX04.

ATC Vet — QD10AX04.

Pharmacopoeias. *Eur.* (see p.vii) includes the hydrated form (see Aluminium Hydroxide, p.1706).

Pumice

Lapis Pumicis; Piedra pómez; Pierre Ponce Granulée; Pumex; Pumex Granulatus; Pumice Stone.

Пемза

CAS — 1332-09-8.

Pharmacopoeias. In *US*.

USP 31 (Pumice). Pumice is a substance of volcanic origin consisting chiefly of complex silicates of aluminium, potassium, and sodium. Odourless, very light, hard, rough, porous greyish masses or gritty, greyish powder. It is stable in air. Practically insoluble in water and not attacked by acids. Three grades of powdered pumice are recognised:

- superfine (=pumice flour)—not less than 97% passes through a No. 200 [US] sieve
- fine—not less than 95% passes through a No. 150 sieve and not more than 75% through a No. 200 sieve
- coarse—not less than 95% passes through a No. 60 sieve and not more than 5% through a No. 200 sieve

Profile

Abrasive agents such as fused synthetic aluminium oxide or powdered pumice have been used either as adjuncts in the treatment of acne (despite doubts about their value—see p.1577) or for the removal of hard skin. Pumice has also been used as a dental abrasive and as a filtering medium. Other agents used as abrasives for acne include polyethylene granules.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Abralux; Ionax Scrub; ***Austral.:*** Brasivol; Ionax Scrub†; ***Braz.:*** Ionax Scrub; ***Chile:*** Ionax Scrub; ***Fr.:*** Brasivol; Ionax Scrub; ***Hong Kong:*** Brasivol†; Ionax Scrub†; ***Irl.:*** Brasivol; Ionax Scrub†; ***Malaysia:*** Ionax Scrub;