The Longwood Herbal Task Force
(http://www.mcp.edu/herbal/default.htm) and
The Center for Holistic Pediatric Education and Research
(http://www.childrenshospital.org/holistic/)

Devil's Claw (*Harpagophytum procumbens*)

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Principal Proposed Use: Anti-inflammatory for degenerative or rheumatic joint disease and tendonitis

Other Proposed Uses: Analgesic for other pains (headache, menstrual pain), antipyretic, antidiabetic, appetite stimulant and bitter tonic, liver and gall bladder tonic, vulnerary

Overview

The major clinical uses for Devil's claw are for pain relief in joint diseases, back pain and headache. The evidence from scientific studies in animals and humans has resulted in widespread use of standardized Devil's claw as a mild analgesic for joint pain in Europe. There are no studies evaluating its effectiveness as an appetite stimulant or liver tonic, but it is widely used for these purposes. The major potential risks and side effects include possible allergies and potential inotropic, chronotropic, antiarrhythmic and hypotensive effects; it is traditionally contraindicated for patients with gastric and duodenal ulcers, but side effects are rarely reported and tend to be limited to mild gastrointestinal upset. Commercial products are occasionally contaminated with inactive plants and other bitter African plants such as *Elephantorrhiza* and *Acanthosicyos.* There are no studies evaluating its safety or effectiveness during pregnancy, lactation, or childhood.

Historical and Popular Uses

Devil's claw is a native of Southern Africa. It has long been used as a tea by indigenous peoples to treat gastrointestinal disorders and rheumatic conditions. A German farmer who had settled in the area exported the plant to Europe where it also became popular among British, European and Canadian herbalists for the supportive treatment of degenerative or rheumatic joint disease, tendonitis and other pains (headache, backache, menstrual pain)[1,2,3,4,5]. It is also used

as an antipyretic, appetite stimulant and bitter tonic, for conditions of the liver, gall bladder and urinary tract, and to treat allergies. An ointment containing Devil's claw root is used as a vulnerary (to treat skin injuries and disorders).

Botany

Medicinal species: Harpagophytum procumbens DC and *H. zeheri*[6]

Common names: Devil's claw, grapple plant, wood spider, *Teufelskralle* (German), *Trampelklette* (German), *griffe du diable* (French).

Botanical family: Pedaliaceae

Plant description: The name derives from the fruits of the perennial plant, which appear to be covered with small hooks. The fruits are 7-20 centimeters long and 6 cm in diameter; they contain approximately 50 dark seeds. The flowers are large, pale-pink to red. The part used medicinally is the dried tubular and secondary roots and the macerated thick lateral tubers, which are cut into slices and dried.

Where it's grown: Devil's claw is native to the red sand areas in the Transvaal of South Africa and Namibia. It has spread throughout the Kalahari and Savannah desert regions. American products are imported from Africa.

Biochemistry

Devils Claw: Potentially Active Chemical Constituents

- Iridoid glycosides (2.2% total weight)[7]:
  - Harpagosides (very bitter flavor): 0.5 –1.6% (minimum of 1.2% in European standardized products)[8]
  - 8-p-coumaroyl harpagide[9]
  - Procumbide and procumboside
- Phenols: acetoside (verbascoside), isoacetoside[10]
- Other: harpagoquinones, amino acids, flavonoids, phytosterols, carbohydrates[11]

Harpagoside has a very bitter flavor which may make some products unpalatable. The iridoid glycosides have dose-dependent anti-inflammatory and analgesic effects equivalent to

phenylbutazone; they are apparently inactivated by gastric acids[12]. Harpagoside is most effective when given parenterally, and loses potency markedly when given by mouth; enteric coated preparations might maintain efficacy despite exposure to gastric acids[13]. Harpagoside inhibits arachidonic acid metabolism through both cyclo-oxygenase and lipoxygenase pathways. The harpagoside content varies within the plant, and is highest in the secondary tubers, with lower levels in the primary roots. The flowers, stems and leaves appear to be devoid of active compounds.

Experimental Studies

Devil's Claw: Potential Clinical Benefits

1. Cardiovascular: Antiarrhythmic
2. Pulmonary: none
3. Renal and electrolyte balance: none
4. Gastrointestinal/hepatic: Appetite stimulant, digestive tonic, liver and gall bladder tonic
5. Neuro-psychiatric: Analgesic: see Immune modulation
6. Endocrine: Antidiabetic
7. Hematologic: none
8. Rheumatologic: Degenerative joint disease: see Immune modulation
9. Reproductive: none
10. Immune modulation: Anti-inflammatory
11. Antimicrobial: none
12. Antineoplastic: none
13. Antioxidant: none
14. Skin and mucus membranes: Vulnerary (wound healing)
15. Other/miscellaneous: none

1. **Cardiovascular:** Antiarrhythmic: This is not a traditional use of Devil's claw.
   i. *In vitro data:* In isolated rat hearts, Devil's claw extracts had a dose-dependent protective effect against arrhythmias induced by reperfusion[14]; similar protective effects were found in isolated rabbit hearts subjected to arrhythmogenic chemicals[14,15].

ii. *Animal data:* In low doses, Devil's claw extracts had mildly negative chronotropic effects and positive inotropic effects[16,17]; high doses caused a marked negative inotropic effect and reduced coronary blood flow[14]. In normotensive rats, intraperitoneal injections of Devil's claw had mild hypotensive effects as well as antiarrhythmic effects[15].

iii. *Human data:* none

2. **Pulmonary:** none
3. **Renal and electrolyte balance:** none
4. **Gastrointestinal/hepatic**: Appetite stimulant, digestive tonic, liver and gall bladder tonic
   a. Appetite stimulant: No randomized trials have evaluated this use.
   b. Digestive tonic
      i. *In vitro data:* In isolated guinea pig jejunum, Devil's claw extracts decreased the contractile response of smooth muscle to acetylcholine[16]; in guinea pig ileum, harpagoside nonselectively inhibited contractions induced by various chemical agonists[18].
      ii. *Animal data:* none
      iii. *Human data:* In an adult case series, oral administration of Devil's claw (1 tsp in 2 cups of water) resulted in improvements in constipation, diarrhea, appetite and flatulence[19].
   c. Liver and gall bladder tonic: No randomized trials have evaluated this use.
5. **Neuro-psychiatric:** Analgesic: See Immune modulation
6. **Endocrine:** Antidiabetic: Traditional use; no data.
7. **Hematologic:** none
8. **Rheumatologic:** Degenerative joint disease[20]: See Immune modulation
9. **Reproductive:** none
10. **Immune modulation**: Anti-inflammatory
    i. *In vitro data:* Devil's claw (100 mg/ ml) had no significant impact on prostaglandin synthesis[21].
    ii. *Animal data:* In several studies in rats, mice and guinea pigs, harpagoside reduced experimentally-induced inflammation[22,23,24,25,26]. In one study, the effects of 20 mg/kg/day of Devil's claw were comparable to 40 mg/kg/day of phenylbutazone[25].

However, Devil's claw extracts were not as effective as indomethacin, nor were they as effective when given by mouth as when given by injection, apparently due to inactivation by gastric acids[12,21,27,28,29].

iii. *Human data:* In normal volunteers, three weeks of daily treatment with 2 grams of standardized Devil's claw extract had no impact on levels of prostaglandin E2, thromboxane B2, leukotriene B4, or 6-ketoprostaglandin F[30]. In 13 arthritic patients treated for 13 weeks with Devil's claw tablets (410 mg TID) there were no significant improvements[28]. In an open trial in 630 adults with joint pain, six months of treatment with Devil's claw extract in daily dosages of 1 – 3 gms TID resulted in pain relief in 42% - 85% (depending on site of pain); the only adverse effect was mild stomach upset even with the highest doses[3].

In a double blind study of adults with joint pain, treatment with 770 mg TID of a standardized Devil's Claw extract resulted in significant improvement in pain and flexibility over two months; no side effects were reported[4,31]. In two separate randomized, double blind, placebo controlled trials of adults suffering from chronic low back pain, Devil's claw treatment provided significant improvement in pain scores within four weeks[32,33].

11. **Antimicrobial:** none
12. **Antineoplastic:** none
13. **Antioxidant:** none
14. S**kin and mucus membranes:** Vulnerary (wound healing): Traditional use; no data.
15. **Other/miscellaneous:** none

Toxicity and Contraindications

All herbal products carry the potential for contamination with other herbal products, pesticides, herbicides, heavy metals, and pharmaceuticals.

This is particularly concerning with imports from developing countries.

Allergic reactions can occur to any natural product in sensitive persons.

Allergic reactions have not been reported.

Potentially toxic compounds in Devil's claw: Unknown. Devil's claw is occasionally adulterated with harpagoside-poor primary roots or with other bitter African plants such as *Elephantorrhiza* and *Acanthosicyos.*

Acute toxicity: In a trial of Devil's claw as a treatment for arthritis, one patient withdrew after four days of therapy due to early morning headache, tinnitus, anorexia and loss of taste[28]. Mild gastrointestinal upset has been reported in sensitive individuals, especially at higher dosages. The LD 50 in mice is greater than 13.5 grams per kg of body weight[21,23,34]. Because of the lack of effect on the biosynthesis of prostanoids, the adverse effects usually expected with non-steroidal anti-inflammatories and glucocorticoid medications are not expected with Devil's claw[30,35].

Chronic toxicity: None in rat studies

Limitations during other illnesses or in patients with specific organ dysfunction: Devil's claw is traditionally contraindicated in patients with gastric or duodenal ulcers due to presumed stimulation of gastric acid secretion; no studies have evaluated this possibility. Because of its stimulant effects on the gall bladder, herbalists recommend that patients with gallstones use Devil's claw only in consultation with a physician. Traditionally, Devil's claw is contraindicated in diabetes, but no data support this assertion. In light of its potential antiarrhythmic effects, potential interactions with antiarrhythmic drugs cannot be excluded.

Interactions with other herbs or pharmaceuticals: None reported

Safety during pregnancy, lactation and/or childhood: Devil's claw is thought to be oxytocic and therefore to be avoided in pregnancy[25]; however, there are no data to support this recommendation, and no data on Devil's claw's safety or efficacy during pregnancy, lactation, or childhood.

Typical Dosages

Provision of dosage information does NOT constitute a recommendation or endorsement, but rather indicates the range of doses commonly used in herbal practice.

Doses are given for single herb use and must be adjusted when using herbs in combinations.

Doses may also vary according to the type and severity of the condition treated and individual patient conditions.

Adult doses[36]:

Dried root:

For pain relief: 3.0 - 4.5 grams of dried root mixed in boiling water, steeped eight hours and taken po TID

For appetite loss: 0.5 - 1.5 grams of dried root, mixed in boiling water, steeped eight hours and taken po TID

Tincture: (1:5 in 25% alcohol): 0.5 – 1.0 ml TID[25]

(1:10 in 25% alcohol): 3 ml TID[37]

Liquid extract: (1:1 in 25% alcohol): 0.1 – 0.25 ml TID[25]

Pediatric dosages: Unknown

Availability of standardized preparations: A German analysis of several commercial products showed variation of harpagoside content from 0.5 to 9.3 mg per tablet, resulting in daily doses of 1.5 to 50 mg[38,39]. Standardized extracts are available; these should be used whenever possible to ensure adequate dosing.

Dosages used in herbal combinations: Variable

Proprietary names: Algophytum, Arthrosetten H, Arthrotabsm, Artigel, Defencid, Devil's Claw Secondary Root, Doloteffin, Fitokey Harpagophytum, Harpadol, Hariosen, Jucurba N, Rheuma-Sern, Rheuma-Tee, HarpagoMega, Salus

Multi-ingredient preparations containing Devil's claw root: Arktophytum, Arthritic Pain Herbal Formula, Devil's Claw Plus, Lifesystem Herbal Formula 1 Arthritic Aid, Lifesystem Herbal Formula 12 Willowbark, Prost-1, Green Lipped Mussel (FM), Harpagophytum Formula.

See Also:

Devil's Claw Clinician Information Summary:

http://www.mcp.edu/herbal/devilsclaw/devilsclaw.cis.pdf

Devil's Claw Patient Fact Sheet:

http://www.mcp.edu/herbal/devilsclaw/devilsclaw.ph.pdf

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