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A Review of Medicinal Plants Effective in the Treatment of Pediatric Umbilical Hernia Based on Traditional Iranian Medicine Sources

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A B S T R A C T

Objective: Umbilical hernia is a common condition in neonates and children, caused by incomplete closure of the umbilical ring after birth. Although most cases resolve spontaneously by age two, some persist and require surgical repair. Traditional Iranian Medicine (TIM), with its extensive botanical heritage and temperament-based principles, offers strategies to strengthen the abdominal wall and relieve symptoms. These approaches may serve as complementary, low-risk options before surgery is considered.

Methods: This review was based on authoritative TIM sources, including *Avicenna's Canon of Medicine*, *Seyyed Esmaeil Jorjani's Zakhireh Kharazmshahi*, *Tohfeh Hakim Momen*, *Makhzan al-Adwiah*, and other classical and digital texts. Keywords such as "hernia," "umbilicus," "medicinal plants," and "topical treatment" were used to retrieve relevant data.

Results: The review identified several plants recommended for umbilical hernia management and abdominal muscle strengthening, used topically or orally. These include *Matricaria chamomilla* L., *Zingiber officinale* Roscoe, *Piper nigrum* L., *Cinnamomum verum* J. Presl, *Malus domestica* Borkh., *Glycyrrhiza glabra* L., *Aloe vera* (L.) Burm.f., *Ricinus communis* L., *Daucus carota* L., *Spinacia oleracea* L., *Allium cepa* L., *Brassica oleracea* L. var. *capitata*, *Brassica oleracea* L. var. *italica*, *Ziziphus jujuba* Mill., *Boswellia serrata* Roxb. ex Colebr., *Pimpinella anisum* L., *Myrtus communis* L., *Pistacia lentiscus* L., *Cicer arietinum* L., *Phaseolus vulgaris* L., *Coriandrum sativum* L., *Olea europaea* L., and *Cynara scolymus* L.

Conclusion: TIM sources suggest that plants with astringent, anti-inflammatory, and muscle-toning properties may enhance local circulation, reduce bloating, and strengthen abdominal structures. Such remedies could be considered as complementary options prior to surgery. Given the limited empirical and clinical evidence, further studies are needed to standardize formulations and evaluate their safety and efficacy

Keywords: Umbilical hernia, Children, Traditional Iranian medicine; Medicinal plants, Topical treatment, Surgery

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Introduction

Umbilical hernia is a prevalent disorder in neonates and children, caused by a weakness or incomplete closure of the abdominal wall at the umbilicus [1]. It typically presents as a visible bulge around the navel, which becomes more prominent during exertion such as coughing or straining [2]. While usually benign and self-resolving during early childhood, persistent cases may result in complications including hernia incarceration or bowel obstruction [2]. Risk factors for umbilical hernia in infants include prematurity, genitourinary anomalies, cystic fibrosis, Down syndrome, undescended testes, family history of hernia, congenital hip dislocation, and conditions such as ascites that increase intra-abdominal pressure [3].

The etiology of pediatric umbilical hernia primarily involves abdominal muscle weakness or failure of the umbilical canal to close properly [4]. This may be congenital or induced by elevated abdominal pressure due to prolonged coughing, crying, or constipation. Genetic factors also contribute to susceptibility. The condition may progressively worsen, leading to severe complications if left untreated [4]. Epidemiologically, umbilical hernia is common among neonates, especially in premature and low birth-weight infants [5]. It occurs more frequently in males and varies in prevalence among different ethnic groups. In most instances, spontaneous resolution occurs within the first few years of life [5]. Clinical signs depend on hernia location (inguinal or umbilical) and include a visible bulge around the navel or groin, localized pain and tenderness, intermittent swelling during crying or straining, irritability, feeding difficulties, and in severe cases, nausea, vomiting, and abdominal discomfort [6].

Pathophysiologically, umbilical hernia arises from weakness in the abdominal wall and surrounding muscles, allowing intra-abdominal contents to protrude through this vulnerable site [7]. In certain cases, hernias can cause intestinal obstruction and severe complications. Chemical therapies are commonly employed to reduce pain and inflammation [7].

Despite the effectiveness of pharmaceutical treatments in symptom control, their adverse effects particularly on the developing child's overall health are a significant concern [8]. The immature immune system and heightened chemical sensitivity in children render them vulnerable to gastrointestinal disturbances, hepatic dysfunction, allergic reactions, and impairment of organ functions due to frequent use of synthetic drugs [9]. Consequently, natural therapeutic approaches based on traditional medicine, particularly phytotherapy, offer a rational and safer alternative or adjunctive option [10]. Medicinal plants, by virtue of their natural origin, generally carry fewer side effects and are extensively recommended in traditional Iranian medicine to strengthen the body, reduce inflammation, alleviate pain, and enhance pediatric immunity [11]. These treatments have been validated not only by modern scientific research but also through centuries of empirical use in human communities. Thus, integrating contemporary medicine with the valuable knowledge of traditional medicine could pave the way for effective and safe pediatric care [12].

Within the framework of traditional Iranian medicine, various strategies have been proposed to fortify the abdominal wall muscles and relieve symptoms of umbilical hernia. These approaches primarily focus on lifestyle modifications, the use of medicinal plants with tonic properties, and topical oil applications. Such interventions may serve as safe and low-risk complementary treatments, potentially delaying or even obviating the need for surgery in many cases, especially in early disease stages. Identifying the medicinal plants effective for alleviating umbilical pain in children constitutes the main objective of this review.

Methodology

This review was conducted by examining authoritative traditional Iranian medicine sources. The materials included prominent classical and herbal medicine texts. Keywords such as "hernia," "umbilicus," "medicinal plants," "topical treatment," "natural therapy," and "traditional treatment" were employed to identify relevant data regarding herbal treatment of umbilical hernia.

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Inclusion criteria

Traditional reports addressing the treatment of umbilical hernia with medicinal plants in Iranian traditional medicine; authentic classical and digital references; articles and texts focusing specifically on non-surgical and herbal remedies for umbilical hernia.

Exclusion criteria

Studies pertaining to other types of hernias (non-umbilical), unrelated sources outside traditional Iranian medicine, and reports lacking sufficient or credible data on herbal treatment for umbilical hernia.

After selection of pertinent studies and credible sources, data were gathered and analyzed to elucidate the properties and therapeutic mechanisms of effective medicinal plants for umbilical hernia.

Results

Traditional Iranian medical texts identify several plants such as *Matricaria chamomilla* L., *Zingiber officinale* Roscoe, *Piper nigrum* L., *Cinnamomum verum* J. Presl, *Malus domestica* Borkh., *Glycyrrhiza glabra* L., *Aloe vera* (L.) Burm.f., *Ricinus communis* L., *Daucus carota* L., *Spinacia oleracea* L., *Allium cepa* L., *Brassica oleracea* L. var. *capitata*, *Brassica oleracea* L. var. *italica*, *Ziziphus jujuba* Mill., *Boswellia serrata* Roxb. ex Colebr., *Pimpinella anisum* L., *Myrtus communis* L., *Pistacia lentiscus* L., *Cicer arietinum* L., *Phaseolus vulgaris* L., *Coriandrum sativum* L., *Olea europaea* L., *Cynara scolymus* L. as natural remedies for strengthening the abdominal muscles and relieving umbilical hernia through topical or oral administration. Detailed information on these plants and their efficacy in pediatric umbilical pain is summarized in Table 1 [13-29].

Table 1: Medicinal Plants Effective in the Treatment of Umbilical Hernia in Iranian Traditional Medicine

Persian Name	Common English Name	Scientific Name	Family Name	Mechanism of Action
Baboneh	Chamomile	*Matricaria chamomilla* L.	Asteraceae	Anti-inflammatory and sedative effects; reduces pain and inflammation in hernia area.
Zanjebil	Ginger	*Zingiber officinale* Roscoe	Zingiberaceae	Anti-inflammatory, pain relief, increases blood circulation, helps reduce hernia inflammation.
Felfel Siah	Black Pepper	*Piper nigrum* L.	Piperaceae	Increases blood flow, relieves pain, anti-inflammatory effects on damaged area, reduces hernia severity.
Darchin	Cinnamon	*Cinnamomum verum* J. Presl	Lauraceae	Anti-inflammatory and analgesic properties, improves digestion and relieves gastrointestinal issues linked to hernia.
Sib	Apple	*Malus domestica* Borkh.	Rosaceae	Strengthens digestive system and reduces inflammation, helps heal

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				hernias caused by digestive weakness.
Shirinbiyan	Licorice	*Glycyrrhiza glabra* L.	Fabaceae	Anti-inflammatory, pain-relieving, boosts immunity, improves digestion, reduces hernia inflammation.
Aloe Vera	Aloe Vera	*Aloe vera* (L.) Burm.f.	Asphodelaceae	Reduces inflammation and digestive irritation, helps heal hernias by relieving pain and inflammation.
Roghan Karchak	Castor Oil	*Ricinus communis* L.	Euphorbiaceae	Anti-inflammatory and analgesic, increases blood flow and relieves pain in hernia area.
Havij	Carrot	*Daucus carota* L.	Apiaceae	Strengthens immunity and digestive health, helps reduce inflammation and improves hernia conditions.
Esfenaj	Spinach	*Spinacia oleracea* L.	Amaranthaceae	Anti-inflammatory, digestive tonic, aids treatment of gastrointestinal hernias and improves overall health.
Piaz	Onion	*Allium cepa* L.	Amaryllidaceae	Reduces inflammation, boosts immunity, improves digestive function, helps reduce hernia complications.
Kalam	Cabbage	*Brassica oleracea* L. var. capitata	Brassicaceae	Anti-inflammatory, improves digestion, reduces swelling and inflammation in hernia area.
Kalam Broccoli	Broccoli	*Brassica oleracea* L. var. italica	Brassicaceae	Anti-inflammatory, immune booster, improves digestion and relieves gastrointestinal hernias.
Sedr	Jujube	*Ziziphus jujuba* Mill.	Rhamnaceae	Anti-inflammatory, immune booster, helps reduce inflammation and pain from hernia.
Kondor	Frankincense	*Boswellia serrata* Roxb. ex Colebr.	Burseraceae	Anti-inflammatory, pain-relieving, reduces inflammation in hernia area.

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Anison	Anise	*Pimpinella anisum* L.	Apiaceae	Sedative and analgesic effects, helps reduce spasms and pain caused by hernia.
Mored	Myrtle	*Myrtus communis* L.	Myrtaceae	Immune booster and anti-inflammatory, helps relieve pain and reduce hernia inflammation.
Mostaki	Mastic	*Pistacia lentiscus* L.	Anacardiaceae	Anti-inflammatory and analgesic, improves digestive function, reduces hernia inflammation.
Nokhod	Chickpea	*Cicer arietinum* L.	Fabaceae	Immune and digestive booster, aids treatment of gastrointestinal hernias and inflammation reduction.
Lubia	Bean	*Phaseolus vulgaris* L.	Fabaceae	Enhances digestive function, helps treat gastrointestinal hernias, reduces inflammation in hernia area.
Geshniz	Coriander	*Coriandrum sativum* L.	Apiaceae	Anti-inflammatory, pain relief, improves digestive function, helps reduce hernia inflammation.
Zeytun	Olive	*Olea europaea* L.	Oleaceae	Anti-inflammatory, digestive booster, reduces pain and inflammation in hernia area.
Kangar Farangi	Artichoke	*Cynara scolymus* L.	Asteraceae	Liver and digestive booster, improves hernia condition by reducing inflammation and aiding digestion.

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Discussion

The significance of traditional medicine in pediatric care, particularly in the treatment of umbilical hernia, cannot be overlooked [30]. Umbilical hernia is a common condition among infants and children, arising from the incomplete closure of the umbilical ring after birth [30]. Although in most cases this condition resolves spontaneously by the age of two, persistent cases often require surgical intervention [30]. However, Iranian traditional medicine, which boasts a rich herbal heritage and a foundation in temperament theory, offers complementary and non-invasive approaches aimed at strengthening the abdominal wall muscles and alleviating hernia symptoms. These remedies may be considered prior to deciding on surgery [31].

For centuries, medicinal plants have been employed in Iranian traditional medicine to fortify abdominal muscles and relieve symptoms associated with umbilical hernia [32]. These treatments typically possess astringent, anti-inflammatory, and muscle-strengthening properties that enhance local blood circulation, reduce bloating, and reinforce the structural integrity of the abdominal wall [33]. Herbs such as chamomile, ginger, black pepper, cinnamon, licorice, aloe vera, and castor oil have been recommended either topically or orally to support muscle strength and tissue repair [34].

The mechanisms of action of these plants are multifaceted. Astringent compounds promote tissue tightening and reduce inflammation, while anti-inflammatory agents decrease swelling and local pain [35]. Moreover, certain phytochemicals stimulate collagen synthesis and improve muscle strength, thereby facilitating the natural healing process of hernias. For instance, the active constituents of chamomile and cinnamon exhibit notable anti-inflammatory and antioxidant effects that aid tissue repair [35]. Similarly, the muscle-strengthening effects of ginger and licorice have been attributed to their modulation of inflammatory pathways and enhancement of blood flow [35].

Despite the longstanding traditional use of these remedies, robust clinical evidence regarding their efficacy and safety in treating pediatric umbilical hernia remains limited. This gap underscores the urgent need for systematic scientific investigations and standardized herbal formulations to determine optimal dosages and potential side effects. Such research could bridge the divide between traditional knowledge and modern medicine, offering safer, more affordable, and accessible treatment options for children.

In conclusion, integrating Iranian medicinal plants into the management of pediatric umbilical hernia holds considerable promise. By harnessing the therapeutic properties of these herbs, non-surgical treatment outcomes may be improved, potentially reducing the necessity for operative procedures. Future studies should prioritize clinical trials and pharmacodynamic research to substantiate the role of phytotherapy in this domain, thereby advancing evidence-based healthcare for children.

Conclusion

From the perspectives of traditional medicine and pharmacology, medicinal plants contain bioactive compounds with astringent, anti-inflammatory, and muscle-strengthening effects. These properties contribute to improved local blood circulation, reduced inflammation and bloating, and enhanced muscular support of the abdominal wall. Such benefits facilitate tissue repair and allow these plants to be utilized as complementary and safe treatments prior to surgical intervention. Nonetheless, due to a paucity of empirical data and comprehensive clinical trials, further rigorous research is necessary to elucidate molecular mechanisms, effective dosages, and safety profiles of these herbal compounds. This will enable the development of standardized and efficacious formulations that meet both scientific rigor and clinical applicability.

Statements and Declarations

Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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