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# Evidence Summary: Turmeric (curcumin) in wound management — (Limited Resources Communities — LRCs)

Updated: March 2017

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## QUESTION

What is the best available evidence regarding the use of turmeric in wound management?

## BACKGROUND

Turmeric is a plant from which the rhizome is used to prepare a spice. In Indian and Asian cultures, turmeric spice has traditionally been used as a treatment for a wide variety of conditions including wounds.<sup>1</sup> It contains high concentrations of an active chemical substance curcumin.<sup>2</sup> Curcumin is reported as having, among others, anti-inflammatory, antioxidant, antimicrobial and anti-cancer properties and is used to treat a wide range of conditions.<sup>3,4</sup> There are few published studies on the use of curcumin in human wound care, with evidence primarily provided from in-vitro and in-vivo studies.<sup>5,6</sup>

## CLINICAL BOTTOM LINE

In relation to the effectiveness of curcumin in wound health, in-vitro studies have demonstrated a protective effect on wound regeneration cells and in-vivo animal studies show superior wound healing. In these studies curcumin has been shown to act at all stages of wound healing by enhancing granulation tissue formation, collagen deposition, tissue remodelling and wound contraction.<sup>5,7</sup>

### Effectiveness in promoting healing

A clinical trial (n=34) evaluated the effectiveness of a turmeric microemulgel in treating plaque psoriasis compared to gel alone, applied twice daily to upper and lower limbs. Using a standardised measurement tool assessing four parameters — redness, thickness and scaliness of lesions, and area of involvement, by nine weeks the turmeric treated lesions showed significant improvement ( $p < 0.05$  — no confidence intervals reported) compared to the lesions treated with the placebo.<sup>8</sup> (Level of evidence 1c)

A second clinical trial of eight weeks involving 21 individuals suffering from moderate to severe plaque psoriasis compared oral curcumin plus one of two types of local phototherapy — real or simulated light — applied to the experimental body area. Both groups received 6 grams of curcumin orally per day. After treatment no patients in the real light group showed moderate or severe plaques, in contrast to the group receiving simulated light ( $p < 0.01$ , no confidence intervals reported). The authors' conclusion was that these results suggested that moderate to severe psoriasis should show a therapeutic response to oral curcumin activated by real light therapy.<sup>9</sup> (Level of evidence 1c) (*Real visible light*: part of the electric magnetic spectrum between infrared and ultraviolet (UV) that is visible to the human eye. The energy is seen as colours.)

A third clinical trial (N=30) assessed the ability of oral curcumin to reduce the severity of radiation dermatitis in patients with breast cancer. The intervention group took 2.0 grams of curcumin three times a day i.e. 6 grams daily throughout their period of radiation therapy. Compared to the placebo group, those receiving curcumin experienced significantly reduced radiation dermatitis [mean radiation dermatitis severity (RDS) — 2.6 vs 3.4,  $p = 0.008$ ]. In addition, the treated group had significantly less moist desquamation (28.6% vs 87%,  $p = 0.002$ ). However, there was no reduction in erythema. In the two patients who had total mastectomies prior to radiation therapy the curcumin appeared to have no effect on the severity of the radiation dermatitis (RDS = 4).<sup>10</sup> (Level of Evidence 1c)

Another clinical trial (N=50) examined the effect of topical application of sandalwood oil and turmeric-based cream on radiation dermatitis with head and neck cancer. The treatment group received daily application of the turmeric cream commenced on the first day until two weeks after completion of radiotherapy. The control group had baby oil applied over the same period. The group using the turmeric cream had delayed appearance and significantly reduced levels of radiation dermatitis at all measured time points, ranging from  $p < 0.015$  to  $p < 0.001$ . Grade 3 toxicity occurred only in 9.5% of the turmeric cream group compared to 37.5% in the baby oil group ( $p < 0.01$ ). There were no reported cases in either group of the highest level of severity (Grade 4).<sup>11</sup> (Level of evidence 1c)

A systematic review of the efficacy of nutritional supplementation in diabetic wound healing found that curcumin was one of three nutrients with the most notable effect of supplementation in related animal studies. However, no human studies were identified that had used curcumin as a nutritional supplement.<sup>12</sup> (Level of evidence 1b) Following oral administration, turmeric is poorly absorbed, rapidly metabolised and quickly excreted in humans<sup>5,13</sup> (Level 5c)

A case study reported that a two year child with “at least” second degree burns to both hands after falling into a campfire commenced treatment four days later with hourly application of curcumin ointment for 24 hours. This was followed by “frequent” (not defined) applications at home. When reviewed at two weeks later there was evidence of rapid healing and at two months healing was complete with no erythema or scarring.<sup>14</sup> (Level of evidence 4d)

### Effectiveness in controlling odour in fungating wounds

In an observational study involving 59 patients with odorous malignant fungating wounds, the application of curcumin ointment (0.5% in white petroleum jelly) reduced the odour in more than 90% of the patients.<sup>15</sup> (Level of Evidence 4b)

## SIDE EFFECTS

Turmeric and curcumin preparations are reportedly well tolerated with lack of significant toxicity. In one study using topical turmeric a small percentage of patients reported side effects: dryness (6%), burning sensation (6%) and irritation (3%).<sup>8</sup> (Level of evidence 1c)

A range of human studies on the effectiveness of oral curcumin in managing inflammatory conditions and cancer reported no systemic adverse effects of oral doses up to 8g daily.<sup>16</sup> (Level of Evidence 1b) However, it is strongly recommended that supplemental doses of turmeric not be given to individuals who are susceptible to kidney stone formation as turmeric can significantly increase urinary oxalate levels.<sup>17</sup> (Level of evidence 1d)

## OTHER FACTORS FOR CONSIDERATION

### Cost effectiveness

No cost analysis studies were identified but the cost is low for turmeric in its traditional form.<sup>2</sup> New formulations e.g. combining curcumin with silver nanoparticles<sup>18</sup> are more expensive.

## CHARACTERISTICS OF THE EVIDENCE

This evidence summary is based on a structured search of the literature and selected evidence-based health care databases (including third world health care journals) combining search terms that describe wound management and turmeric and curcumin. The evidence in this summary comes from:

- One systematic review<sup>12</sup> (Level 1b)
- Four randomised controlled trials<sup>8, 9, 10, 11</sup> (Level 1c)
- One pseudo randomised controlled trial<sup>17</sup> (Level 1d)
- One cross sectional study<sup>15</sup> (Level 4b)
- One case study<sup>14</sup> (Level 4d)
- Eight bench research<sup>1, 2, 3, 5, 6, 7, 13, 18</sup> (Level 5c)
- Literature reviews<sup>4, 16</sup> (various levels of evidence)

## BEST PRACTICE RECOMMENDATIONS

Where available, topical or oral curcumin could be considered as a treatment for promoting healing in psoriasis and radiation dermatitis. (Grade B).

Oral turmeric should **not** be given to individuals who are susceptible to kidney stone formation. (Grade A)

Currently there is no sound evidence from human studies to support the use of curcumin in full thickness wounds or burns.

**Keywords:** psoriasis, radiation dermatitis, turmeric, curcumin, traditional.

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