

PALLIATIVE PEARLS

BY DRAGONFLY HEALTH

Transdermal Fentanyl: Conversion Considerations and Use in Patients with Cachexia September 2026

This resource compiles two archived articles covering transdermal fentanyl use in general and, more specifically, its use in patients with cachexia, including absorption considerations, conversion to and from oral morphine equivalents, case-based recommendations, and monitoring during opioid transitions.

TRANSDERMAL FENTANYL: CLINICAL PRINCIPLES

Transdermal fentanyl (TDF) is indicated for opioid-tolerant patients (those taking, for ≥ 1 week or longer, at least 60 mg oral morphine equivalents (OME) per day)¹ with severe enough pain to require daily, around-the-clock, long-term opioid treatment and when oral alternatives are inadequate and/or no longer feasible.²

- TDF patches release fentanyl into the skin, forming a depot in the upper epidermis before systemic absorption.
- Fentanyl is highly lipophilic and approximately 80% to 85% protein bound. Serum concentrations generally peak 20 to 72 hours after the first application, and steady state is usually reached by the end of the second 72-hour patch application.
- Apply the patch to flat, intact, non-irritated, nonirradiated skin on the chest, flank, back, or upper arm, and avoid exposing the application site or surrounding skin to external heat sources.²
- Dose increases should occur no more frequently than every 3 to 6 days.

Oral Morphine Equivalents to TDF Conversion

Conversion calculations are estimates; patient-specific factors, recent adherence, prior response, organ function, and toxicity risk must inform the selected dose. Utilize clinical judgment before applying any conversion calculation results to prescribed dosing. Conversion ratio recommendations found in manufacturers' product information underestimate the TDF patch strength needed to provide the same analgesia for the given oral morphine equivalents (OMEs). Recognizing this, the following guidance is utilized by Dragonfly Health pharmacists:^{1,3,4}

- Calculate the total daily OME.
- Convert to TDF patch strength utilizing the approximate equivalents in the table below.
- Note: Typically, when converting from one opioid to another, an additional 25% to 50% dose reduction, accounting for incomplete cross-tolerance, is applied; however, this adjustment is already incorporated into the conversions below and does not need to be applied.

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Approximate Equivalents	
Oral Morphine Equivalent	TDF Patch Strength
30 mg/day	12.5 mcg/hour
60 mg/day	25 mcg/hour
120 mg/day	50 mcg/hour
180 mg/day	75 mcg/hour
240 mg/day	100 mcg/hour
300 mg/day	125 mcg/hour
360 mg/day	150 mcg/hour
420 mg/day	175 mcg/hour
480 mg/day	200 mcg/hour

Practice Frequently Asked Questions

Can TDF patches be cut?

No. Product labeling directs users to apply TDF patches immediately after removing them from the sealed package and not to alter or cut them before application.⁵⁻⁸

TDF products use one of three delivery-system designs:⁹

1. **Matrix:** The drug is held in a polymer matrix that controls its release (e.g., Mallinckrodt).⁶
2. **Reservoir:** The drug is contained in a liquid reservoir behind a leak-proof, rate-limiting membrane (e.g., brand Duragesic® (*no longer marketed*), Par (*no longer marketed*)).⁷
3. **Drug-in-adhesive:** The drug is incorporated directly into the adhesive layer (e.g., Mylan, Alvogen).^{5,8}

A 2005 preliminary report by Peng et al. evaluated cutting the reservoir-based Duragesic® product and anticipated that matrix TDF patches (then new) might be cut to provide smaller doses.¹⁰ However, no formal studies have established the clinical effectiveness or safety of cut fentanyl matrix patches; available information remains anecdotal and unsupported.

If a dose lower than the available patch strength is needed, prescribe a lower-strength patch or an alternative opioid and counsel the patient not to cut the patch.¹¹

What should be done if a TDF patch does not adhere well?

Check the patch regularly to confirm that it remains securely attached. If adhesion is poor:^{5,7}

- Apply first-aid tape only along the patch edges.
- If the problem continues, cover the patch with a transparent adhesive dressing such as Bioclusive™, Tegaderm™, or Askina® Derm. Do not use any other bandage or tape.

Can part of a TDF patch be occluded to deliver a smaller dose?

No. Occluding part of a TDF patch to reduce the delivered dose is not recommended. Literature suggesting otherwise cites Lee and Anderson (1997),¹¹ which discusses monolithic transdermal systems generally and does not support partial occlusion of fentanyl products.

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Timing of Fentanyl Conversions

- Consider the unique pharmacokinetic properties when converting to or from transdermal fentanyl:
 - Minimally effective serum concentrations of fentanyl are observed ≥ 12 hours following the application of TDF, with peak concentrations occurring no sooner than 36 hours later.
 - Upon removal, it can take > 17 hours for fentanyl serum concentrations to decrease by 50%.
- Consider empirically reducing the new opioid dose in the frail and/or elderly, then reassess response.
- The scenario-based guidance below is practiced by Dragonfly Health pharmacists:

CONVERTING FROM TDF

- Hour 0: Remove patch (early in morning or late evening)
- Hours 0-12: Use breakthrough medication only
- After 12 hours: Start full dose of new opioid (ATC or long acting)

CONVERTING TO TDF

- Hour 0: Apply patch as soon as possible (ideally with last dose of converted long-acting opioid)
- Hour 0-12: If unable to swallow last long-acting dose, schedule short-acting doses every 4 hours (up to 3 times)
- After 12 hours: Continue using breakthrough as appropriate

CONVERTING FROM TDF TO IVF

- Remove the TDF patch
- Establish IV access and allow as needed bolus dose(s)
- Six hours later, begin at 50% of the target infusion rate (maintain bolus dose)
- Twelve hours later, increase to the target infusion rate (maintain bolus dose)

CONVERTING FROM IVF TO TDF

- Apply TDF at the same strength as the infusion
- Six hours later, reduce the infusion by 50% (maintain bolus dose)
- Twelve hours later, discontinue infusion (maintain bolus dose)
- Twenty-four hours later, discontinue the infusion

TDF USE IN CACHECTIC PATIENTS

Cachexia is a progressive loss of skeletal muscle mass, with or without loss of fat mass, associated with conditions such as cancer, AIDS, and chronic obstructive pulmonary disease. It cannot be fully reversed by conventional nutritional support and is associated with increased mortality. Consensus criteria include weight loss greater than 5% within 6 months in the absence of starvation; a body mass index below 20 with weight loss greater than 2%; or sarcopenia with weight loss greater than 2%.^{13,14} Because cachexia may affect transdermal fentanyl absorption and clearance, opioid selection and conversion should be individualized and guided by clinical response.

Cachexia and TDF Absorption

The practice of adjusting the oral morphine-to-TDF ratio solely because a patient is cachectic is largely unsupported. Heiskanen and colleagues compared 10 cachectic patients with 10 patients without cachexia and reported significantly lower fentanyl plasma concentrations at 48 and 72 hours after patch application in the cachectic group, despite a need for higher TDF doses for pain relief; however, additional evidence has not confirmed these findings.¹⁵ Nomura and colleagues observed lower fentanyl concentrations in patients with low serum albumin after conversion from intravenous fentanyl to TDF. Because fentanyl is highly albumin bound, increased transcapillary albumin leakage into subcutaneous and muscle interstitial spaces in cachexia may contribute to lower blood concentrations.¹⁶

Clinically, absorption and response remain patient specific. Manufacturer guidance warns that life-threatening respiratory depression may be more likely in elderly, cachectic, or debilitated patients because of altered

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pharmacokinetics or clearance. Close monitoring is essential during initiation and titration and when TDF is combined with other respiratory depressants.²

Case 1: Converting Oral Morphine to TDF in a Cachectic Patient

RL is a 64-year-old woman with breast cancer metastatic to the brain, bones, and spine. She has had significant weight loss, recent confusion, poor medication adherence, and uncontrolled pain that was previously well controlled. She lives alone, and family members visit several times weekly to assist with activities of daily living.

The patient's physician has asked for a recommendation for transdermal fentanyl (TDF) to improve medication compliance and to better control her pain. Her current regimen includes:

- Morphine sustained-release 100 mg by mouth every 8 hours for pain
- Morphine 20mg/ml solution; 1ml (20 mg) by mouth every 4 hours as needed for pain (the number of breakthrough doses is unknown)

Assessment and Recommendations^{1,2,15}

- The known scheduled opioid use equals 300mg OME/day. Using the conversion guide provided, TDF 125mcg/hr patch is the equivalent estimated.
- Because RL has not been adherent recently, has impaired cognition and cachexia, and lacks around-the-clock caregivers:
 - Initiate a reduced TDF dose of 100 mcg/hour applied every 72 hours rather than assuming continued tolerance to the full calculated dose.
 - Continue the current morphine concentrate for breakthrough pain.
 - Monitor pain severity, breakthrough use, sedation, confusion, and difficulty arousing the patient.
 - Reassess and titrate after 3 to 6 days; more frequent increases may raise the risk of adverse effects or overdose.

Practice Considerations

- Do not automatically increase the calculated TDF conversion ratio because a patient is cachectic.
- If a cachectic patient does not respond to a recent TDF increase, reassess the pain type for opioid and/or non-opioid appropriateness and route of administration alternatives; use the last known effective TDF strength for subsequent opioid conversion calculations.¹
- Ensure ready access to an appropriate breakthrough opioid and track actual use, particularly during the first 12 to 72 hours after TDF initiation as serum concentrations rise.^{1,4}
- Consider adherence, cognition, caregiver availability, swallowing ability, albumin level (if known), recent weight loss, prior opioid exposure, and adverse-effect risk.
- Monitor closely when initiating, titrating, or discontinuing TDF, and avoid dose escalation more frequently than every 3 to 6 days.²

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Case 2: Converting TDF to Oral Morphine

DS is a 76-year-old man with metastatic lung cancer, hypertension, and chronic obstructive pulmonary disease. His medications include:

- Transdermal fentanyl 75 mcg; Apply 1 patch topically every 72 hours for pain
- Morphine 15mg tablet; Take 1 tablet by mouth every 4 hours as needed for pain
- Senna 8.6 mg; Take 2 tablets by mouth twice a day for constipation
- Dexamethasone 4 mg; Take 2 tablets by mouth every morning for pain and shortness of breath
- Ipratropium-albuterol; Inhale via nebulizer 4 times a day and every 4 hours as needed for shortness of breath
- Albuterol HFA inhaler; 2 puffs by mouth every 4 hours as needed for shortness of breath
- Lisinopril 10 mg; Take 1 tablet by mouth every morning for high blood pressure

Pain had been controlled with TDF 50 mcg/hour for about 2 months, however chest and leg pain later increased. The TDF dose was raised to 75 mcg/hour without pain relief after 3 days, while frequent oral morphine continued to provide relief. DS has lost approximately 8% of his body weight over 3 months and diagnosed with cachexia. He can swallow without difficulty. The prescriber is considering increasing the fentanyl patch strength again and has asked for your input.

Assessment and Recommendations

- The lack of response to the higher TDF dose, together with continued response to oral morphine, may indicate inadequate transdermal fentanyl exposure.
- Perform a new pain assessment to confirm that opioid therapy remains appropriate.
- For conversion, use the last effective TDF dose of 50 mcg/hour, equivalent to approximately 120 mg oral morphine/day, rather than the ineffective 75 mcg/hour dose.¹
- Discontinue TDF and target morphine extended-release 60 mg by mouth every 12 hours.
- A typical breakthrough dose is 10% to 20% of the total daily dose, or 12 to 24 mg for this calculation; increase morphine immediate-release from 15 mg to 30 mg by mouth every 3 hours as needed, with close monitoring and reassessment.
- Suggested transition steps:
 1. Remove the TDF patch.
 2. During the first 12 hours after removal, use only the rescue opioid: morphine 30 mg by mouth every 3 hours as needed.
 3. Twelve hours after removal, begin morphine extended-release 60 mg by mouth every 12 hours; continue rescue opioid as needed.¹⁶
 4. Because fentanyl remains in the skin depot after patch removal, monitor closely for delayed opioid effects, respiratory depression, sedation, confusion, pain control, and rescue-dose use throughout the transition.

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SUMMARY

Cachexia may alter transdermal fentanyl absorption and clearance, however current evidence does not support automatically adjusting standard opioid conversion ratios solely because a patient is cachectic. TDF dosing should be individualized according to prior opioid exposure, adherence, clinical response, breakthrough use, swallowing ability, cognition, caregiver support, and toxicity risk. When converting to or from TDF, use the last effective opioid dose, provide an appropriate rescue opioid, account for fentanyl remaining in the skin after patch removal, and monitor closely for pain control, sedation, confusion, and respiratory depression. Dose changes should be conservative, with TDF increases no more frequently than every 3 to 6 days.

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