

## MEDICINAL CANNABIS: PRACTICAL ASPECTS OF DOSING, ADMINISTRATION AND TITRATION

Cannabis strains vary in composition and potency. While a great deal of practical experience and insight is available to guide the patient in matching strain selection to specific disease states, some initial titration is likely to be necessary before determining whether a given strain is appropriate to treatment of a given individual's condition, and what total dosage is required to provide the desired effect.

Lack of "standardization" need not be a strong concern. Cloned strains continue to provide consistent effect with respect to the parent strain; while sexually-bred strains may vary somewhat more, the overall effect will still be fairly predictable. Due to cannabis' *extremely low acute toxicity*, the "personal bioassay" can be conducted safely, with little oversight.

*Two primary routes: **inhalation**, and oral **ingestion***

> **Inhalation** (via combustion, or vaporization) is an effective means of delivering many medications

### *Advantages:*

Rapid onset of action

Fast titration to effect

Avoids first-pass hepatic metabolism

Efficient use of biomass – active ingredients conserved, smaller doses required

Heat "activates" active ingredients, by decarboxylating the acidic cannabinoid forms

Can be used by patients too nauseated to retain oral medication

### *Disadvantages:*

#### \*Combustion -

Generates particulates, carbon monoxide, "tars" which can lead to mechanical pulmonary problems with prolonged heavy use (COPD as chronic bronchitis, but not lung cancer)

Creates objectionable smells

Use of paper-wrapped cigarettes ("joints") contributes contaminants

#### \*Vaporization –

Vaporization apparatus expensive, and sometimes cumbersome

Patients with severe pre-existing lung disease may find it difficult to inhale and retain vapor long enough, due to chronic air hunger

> **Oral** ingestion

*Advantages:*

Avoids any adverse pulmonary effects

Acts as “sustained release” preparation, as bolus moves through stomach and intestine; this prolongs dosage intervals, suitable for many activities of daily living during which inhaling is not feasible, e.g. plane trips.

*Disadvantages:*

Allows first-pass metabolism of THC into 11-hydroxy THC, which is more psychoactive  
Longer persistence of dose-effect makes initial titration process slower; inadvertently “overshooting” the initial dose, which will not be apparent for up to an hour after ingestion, can be temporarily disorienting. (One must wait for an hour after the first dose before knowing if the dose was appropriate; if it turns out to have been too high, one is “stuck with it” until it wears off.)

Larger volumes of plant material are consumed, by comparison with inhalation; the relative inefficiency of the oral route could be problematic when supplies of medication are scarce or expensive

***Approach to titration:***

(It is wise to perform the initial titration with a friend or relative present.)

Inhaled:

- >Select cannabis strain based on available information, from dispensary or other patients, regarding disease specificity
- >Place small amount of medicine in combustion chamber of pipe, or vaporization chamber of vaporizer. (For patients whose dosage is likely to be high, the use of cigarettes is not recommended, due to the paper component. The use of a water pipe – e.g. bong, or hookah - will cool the smoke, but also removes some of the active medicinal ingredients without fully eliminating noxious fumes and particulates.)
- >While touching flame to medicine if smoking, or triggering vaporizer, slowly inhale to level of comfort. Retain smoke or vapor as long as possible.
- >Exhale, then breathe normally.
- >Wait five minutes. Repeat inhalation every five minutes until degree of improvement is perceptible, or psychoactive dimension reaches levels of tolerance.

(Note: full improvement resulting from this medication may occur rapidly, but some conditions require weeks to build full effect, as is the case with many current medications.)

Oral:

- >Select desired cannabis strain. Recipes can be obtained from the internet, or from one’s local dispensary. Options include the traditional chocolate brownies, fudge, cannabis-infused butter, cupcakes, etc.

- >Novice users should ingest their first small amount of the cannabis food after eating something, e.g. glass of milk with a cookie. Taken on an empty stomach, the onset of action can be faster and more pronounced: the “rush” phenomenon which cannabis-naïve patients might find initially disconcerting. Experienced users might wish to take their first dose of a new strain on an empty stomach, since this speeds the titration by producing recognizable effects sooner.
- >Wait an hour.
- >A second dose, half the size of the first, can then be taken if the first did not produce desired results. Rather than take a third dose when the first two have been insufficient, a naïve user should wait until the following day, then begin with an amount equal to one-and-one-half or twice that of the first day’s initial dose. This approach can be repeated until either the desired effect has been achieved, or until side-effects make further dose increases inadvisable; at that point, either stay with the maximum tolerable dose for a few days (tolerance to psychoactive effects develops rapidly, while emergence of full therapeutic effect can take longer) or consider trying a different strain.
- >If the first small dose should prove to be excessive, wait until the next day, then use half the initial dose. Resume titration as above.

In event of “overdosing” during initial titration, no specific supportive measures are required. A degree of dysphoria may ensue, but it will dissipate without doing any damage. There is no recorded case of organ damage or death due to “overdosing” with cannabis. Listening to music, or sipping a cool non-alcoholic beverage can be useful until the discomfort goes away.

With a little patience and persistence, a titration can be conducted using any cannabis strain, or any time a new strain is being considered. Experienced users will be able to titrate much more rapidly using either inhalation or ingestion, while inexperienced patients will prefer to proceed more slowly.

If a patient discovers that inhaled cannabis does provide relief of symptoms, but that the required dosage involves multiple inhalation sessions throughout the day, he or she is advised to introduce oral dosing. The long-acting effect produced by the oral route then becomes the primary therapeutic avenue, and infrequent inhalation is only invoked to fine-tune the sustained oral control, or to act as a “rescue drug,” in much the same sense as we use rapid-acting agents for breakthrough asthma or pain.